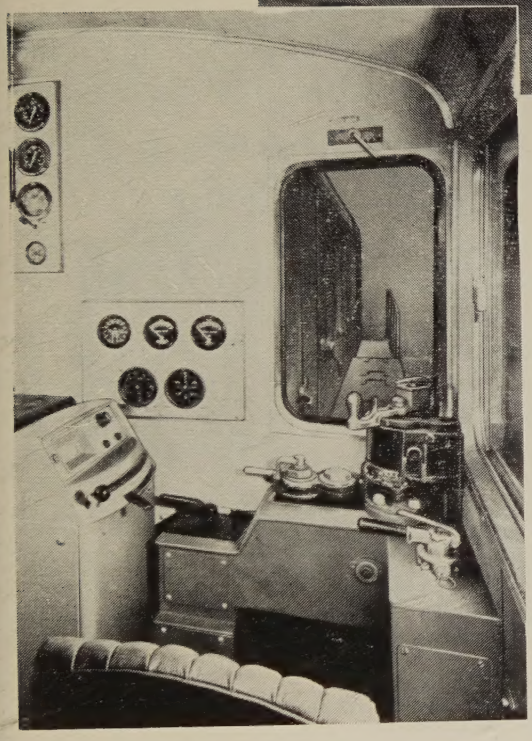
56.06
N T
A 2

VOL. XXXVII. — No. 2. FEBRUARY 1960.

Monthly Bulletin of the International Railway Congress Association

(English Edition)

APR 13 1960
LIBRARY



"EXPLORER"

BUILT BY THE BRITISH-THOMSON HOUSTON CO. LTD. AND LISTER-BLACKSTONE RAIL TRACTION LTD.

This 1100-H.P. mixed traffic Diesel-Electric Locomotive is designed for operating on the lighter type of railway in overseas territories where freight forms a large proportion of the total traffic.

★

This versatile role demands a versatile braking system and

WESTINGHOUSE

VACUUM/AIR BRAKE EQUIPMENT

is fitted, which includes a straight air brake, controlled by a self-lapping brake valve, for use when running light or hauling unbraked stock, and a vacuum-controlled air brake system for coupling to a vacuum braked train; an automatic air brake can also be fitted for use with air braked trains.

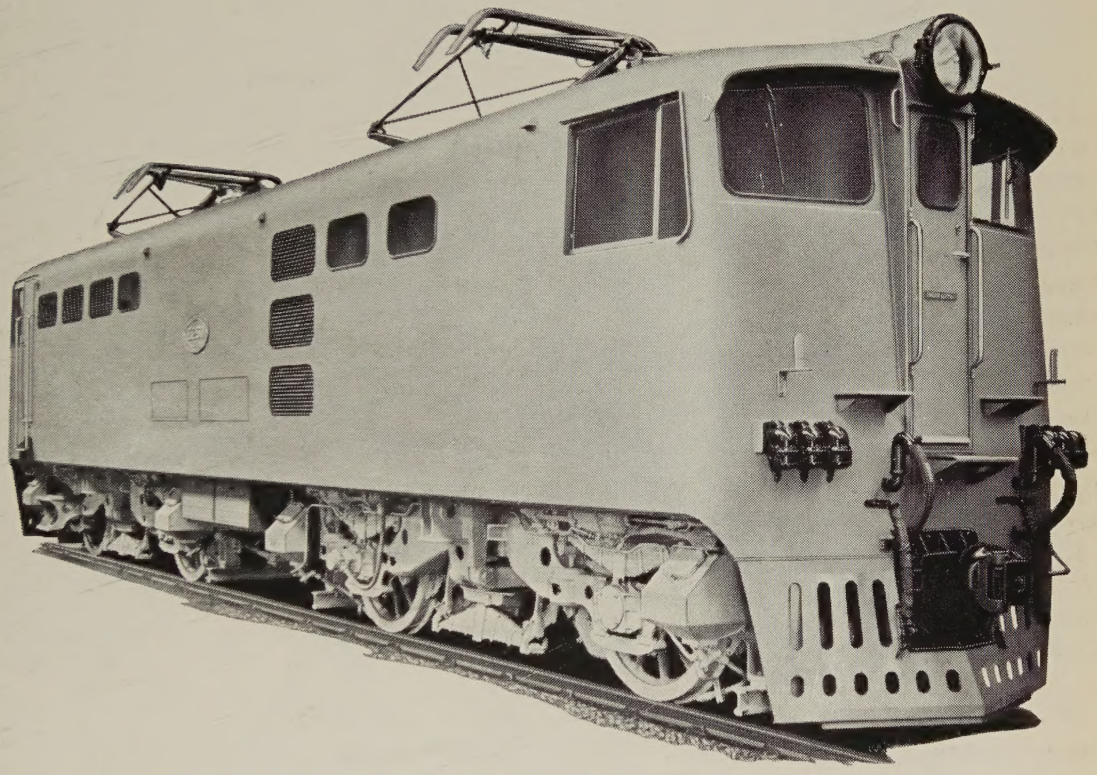
The Westinghouse equipment includes all the brake control gear, compressors, and exhausters.

Westinghouse Brake and Signal Co. Ltd., 82 York Way, Kings Cross, London, N.1

Alphabetical Index of Advertisers

Firms :		Specialities :
A E I (Associated Electrical Industries Limited)	V	Traction problems.
Alsthom	VI	Electric locomotives.
B.P.	X	Railway lubrication.
Cockerill-Ougrée (S.A.)	—	Steam and Diesel locomotives.
English Electric Company Ltd. (The)	III	Railway electrification.
Ericssons (LM) Signalaktiebolag.	—	Railway signalling.
General Electric Co. Ltd. (The)	IX	Electric traction equipment.
Hasler (A.G.)	VI	Speed indicators and recorders.
Lister Blackstone Rail Traction Ltd.	VIII	Diesel electric locomotives.
Marelli & C. (S.p.A.)	VII	Complete electrical equipment for locomotives.
Matisa Equipment Limited	—	Permanent way equipment.
Metropolitan-Cammell Carriage & Wagon C° Ltd.	—	Lightweight railway coaches. Diesel locomotives.
Öberg (C.O.) & Co:s AB	—	Files.
Pressed Steel Co. Ltd.	IV	Wagons.
R.I.V. (Officine di Villar Perosa)	—	Axleboxes.
S.A.B. (Svenska Aktiebolaget Bromsregulator)	—	Automatic slack adjusters.
Schepens (Ateliers)	—	Industrial ventilation.
Siemens and General Electric Railway Signal Co. Ltd.	—	Signalling equipment.
S.K.F. (Société Belge des Roulements à Billes)	—	Axleboxes.
United Steel C^{ies} Ltd. (The)	—	Railway materials.
Westinghouse Brake and Signal Co., Ltd.	I	Railway signalling. Brakes.

2000 h.p. electric locomotives for South Africa



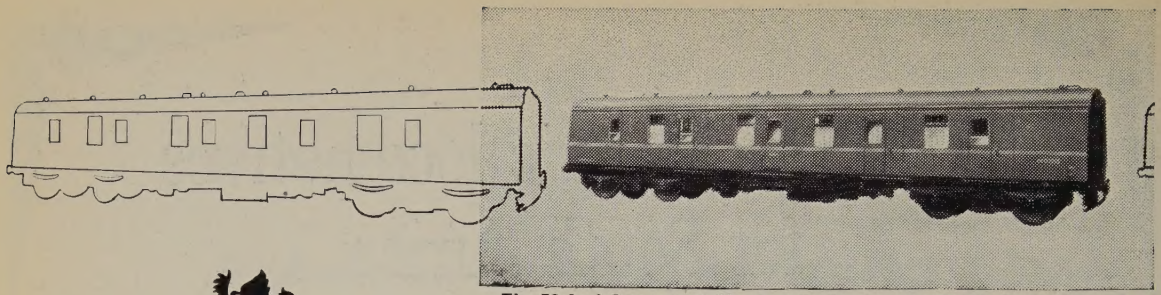
'English Electric' have supplied a total of 160 Class 5E 3,000 volt D.C. Bo-Bo type electric locomotives to the South African Railways.

'ENGLISH ELECTRIC'

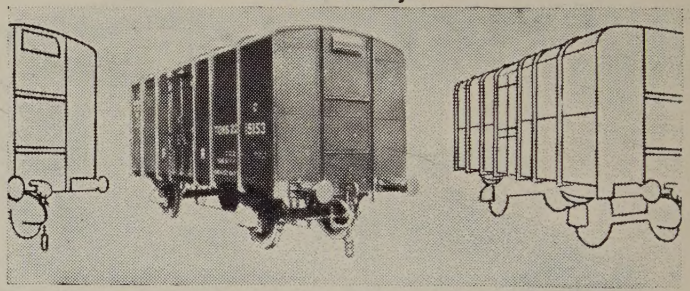
in association with:

VULCAN FOUNDRY • ROBERT STEPHENSON & HAWTHORNS

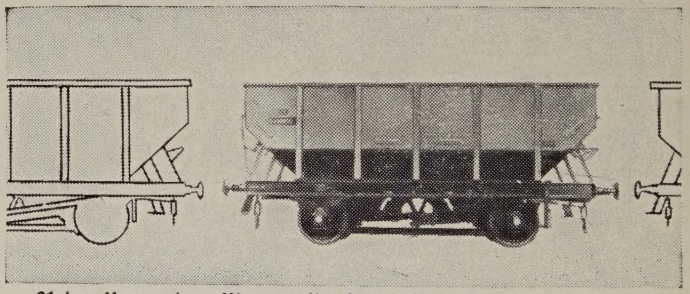
TDE.43A



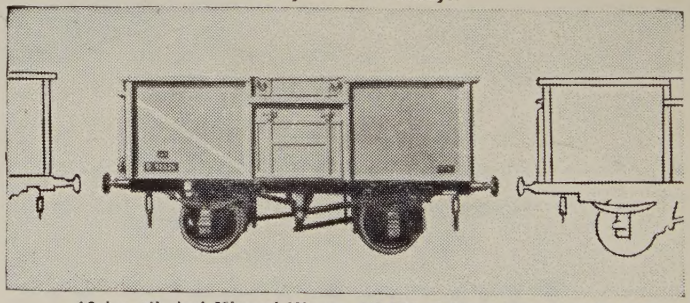
The 58-foot Gangwayed Standard Brakevan, supplied by Pressed Steel to British Railways.



Broad gauge Covered Wagon type C.R., as used by Indian Railways.



21-ton Hopper-type Wagon with drop bottom door for minerals, as used by British Railways.



16-ton all steel Mineral Wagon. 74,000 of these have already been delivered from our Paisley works.

A train 300 miles long

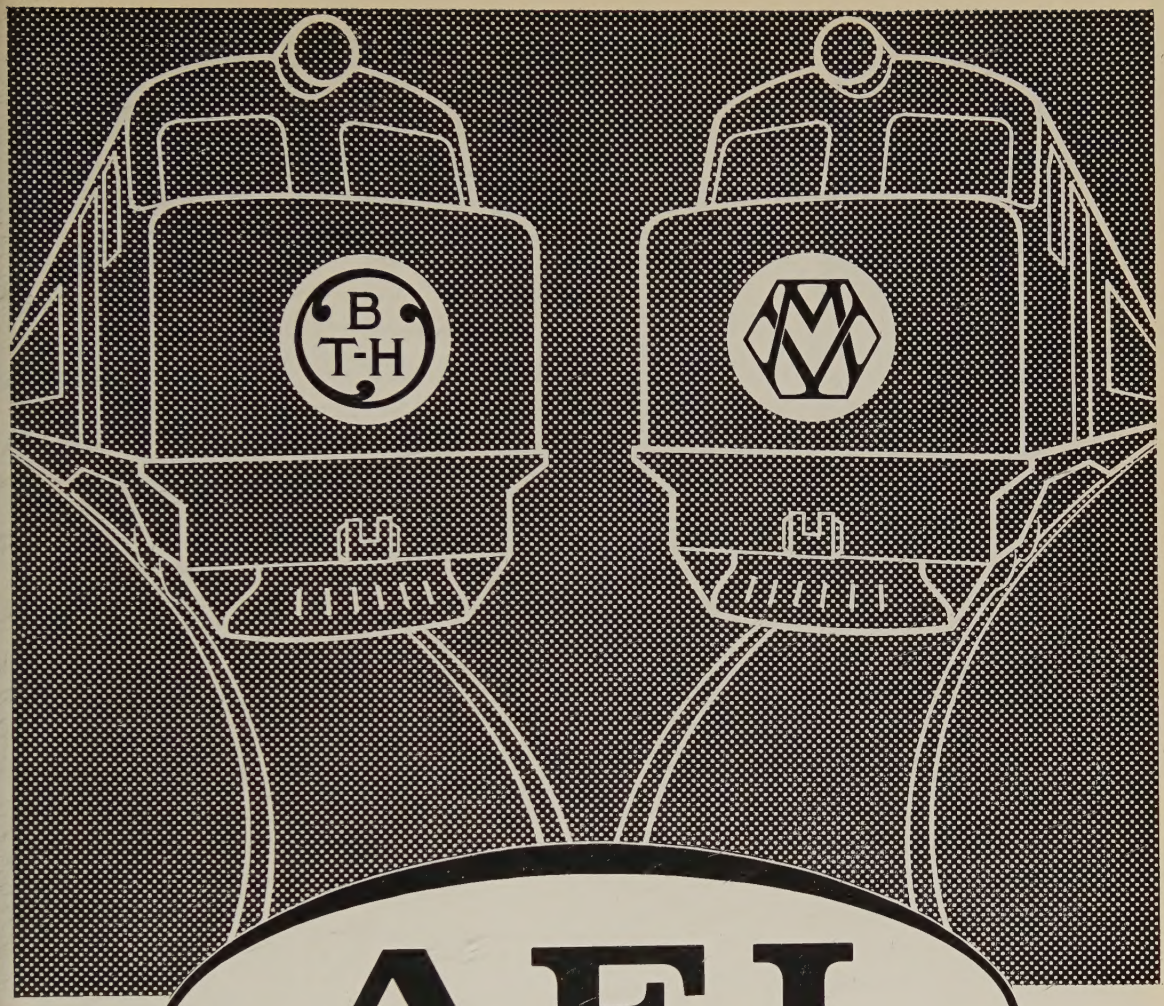
In the last eight years, Pressed Steel have produced enough railway rolling stock to make a train over 300 miles long. Rolling stock of all types, for all gauges, at home and overseas. You see some of these carriages and wagons opposite.

Clearly, Pressed Steel have enormous productivity. Their record shows it. But what the figures do not show is the store of experience built up by our designers and engineers over the last 300 miles of rolling stock. At Pressed Steel we use this experience to make sure that each wagon we produce is a sound engineering job, that it is produced as economically as possible, and in an absolute minimum of time. And we use this experience in intensive research, which will enable us to play our part in developing new and better carriages and wagons in the future.

PRESSED STEEL COMPANY LIMITED

RAILWAY DIVISION, PAISLEY, SCOTLAND.
London Office: RAILWAY DIVISION,
47 VICTORIA STREET, LONDON, S.W.1.
Head Office: COWLEY, OXFORD.

Manufacturers also of motor car bodies. Prestcold refrigeration equipment and pressings of all kinds.



AEI
Traction Division

New name

The traction interests of Metropolitan-Vickers and British Thomson-Houston have now been integrated in the new Traction Division of AEI.

Combined resources

Pooling of resources, knowledge and experience will bring advantages in design, manufacture, consultation and service.

Staff you know

This specialised service on traction and all associated equipment is available from design, production and sales staff you already know, and who are familiar with your problems.

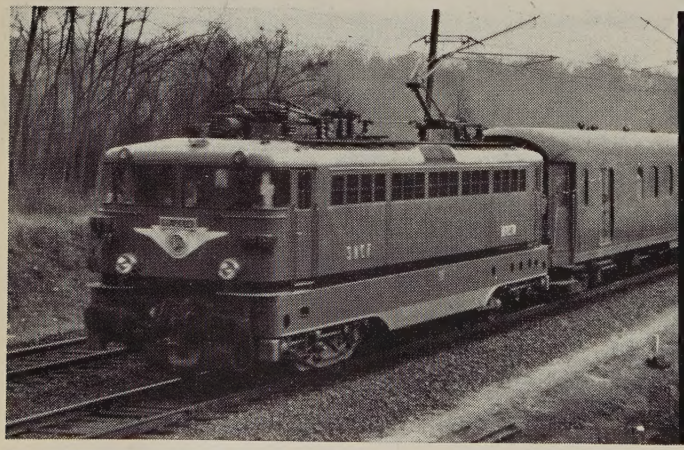
AEI **Associated Electrical Industries Limited**
Traction Division

11 GROSVENOR PLACE, LONDON SW1 · TRAFFORD PARK, MANCHESTER 17 · RUGBY · SHEFFIELD

TELOC Speed Indicators and Recorders

Hasler SA Berne

are appreciated throughout the world as they provide valuable information to the traffic Manager for the reorganisation and speeding up of railway services. TELOC instruments have, in fact, recently been installed on the Trans Europe Express Trains operating between Switzerland and Holland.



ALSTHOM
has built since 1949,

1 000
ELECTRIC
AND DIESEL-ELECTRIC
LOCOMOTIVES,

totalizing an output of about 3 MILLIONS HP.

BB 16 500 locomotive. 3 500 H. P. 68 metric tons. French National Railways

ALSTHOM
TRACTION

38, AVENUE KLÉBER - PARIS

Marelli

COMPLETE ELECTRICAL EQUIPMENT FOR D. C., A. C.
DIESEL-ELECTRIC LOCOMOTIVES
AND FOR METROPOLITAN RAILWAYS

DIESEL-ELECTRIC locomotive built by MARELLI-NUOVE REGGIANE for the South-East Railways S. P. A. Type Standard « UNIFER B 13 ». — U. I. C. continuous power 825 HP — 13 units are being built.

280 1 350 HP DIESEL-ELECTRIC locomotives, type Co-Co, are being constructed for the Argentine Railways by the ITALIAN and ARGENTINE group G. A. I. A. Projects and design are by E. MARELLI & C., S. P. A. The electric traction equipments are of the same design as above.

ERCOLE MARELLI & C. - S.p.A. - MILANO

The LISTER BLACKSTONE locomotive 'Explorer' type

fitted with 1200 h.p. Rail Traction Diesel Engine

Type tested to B.S. 2953 at traction ratings of 1200 b.h.p. and 1100 b.h.p. It is fitted with AEI electric transmission.

For details of this and other locomotives please write to :

LISTER BLACKSTONE RAIL TRACTION LTD

Imperial House, Kingsway, London W.C. 2.

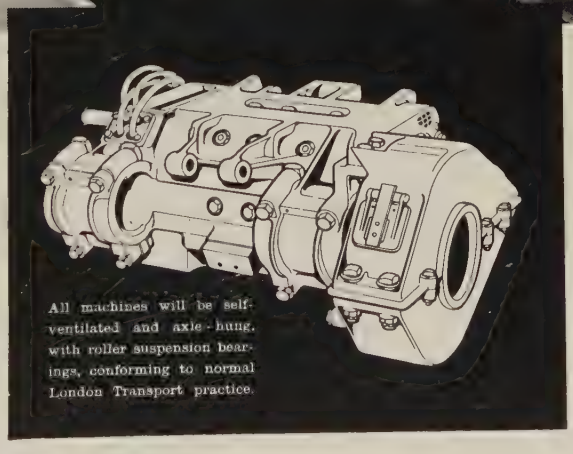
Phone : TEMple Bar 5843. Cables : Tracral London. Telex : 43-23

1,200 G.E.C. traction motors ordered by London Transport

The motors are for tube and surface rolling stock to implement London Transport's replacement programme announced last year. All these machines will be built at the new traction motor works of the G.E.C. at Dudley Port, Staffs.

The Piccadilly Line will have 760 G.E.C. traction motors with a continuous rating of 80.5 h.p. at 66% field. They will be generally similar to the 32 machines already supplied by G.E.C. for the three prototype tube trains now running on the Piccadilly Line.

The Metropolitan Line of London Transport will have at least 446 G.E.C. traction motors with a continuous rating of 69.5 h.p. at full field. With the completion of these orders G.E.C. will have supplied over 4,500 railway traction motors to London Transport since 1925.

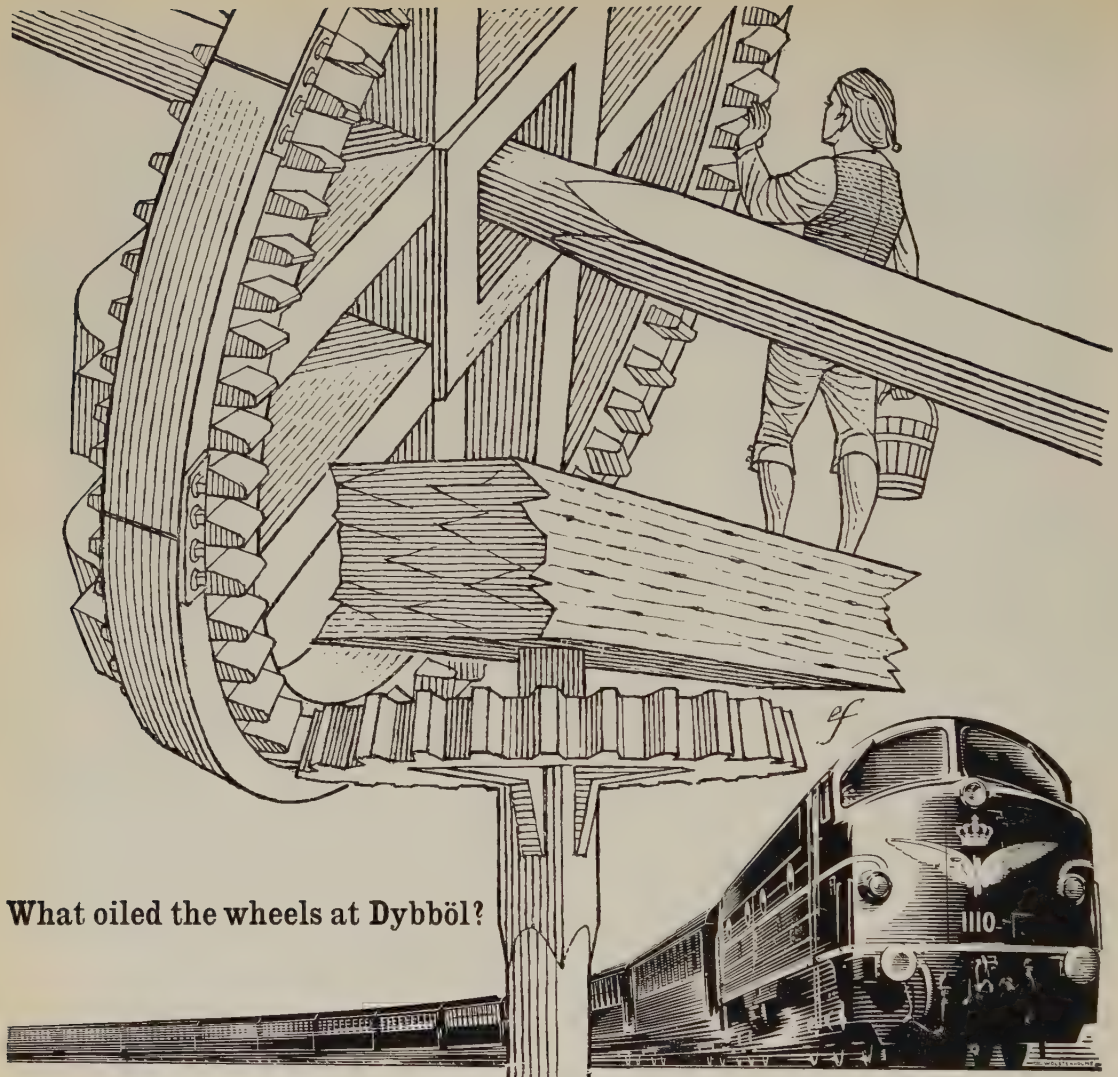


All machines will be self-ventilated and axle-hung, with roller suspension bearings, conforming to normal London Transport practice.

G.E.C. traction motors

THE GENERAL ELECTRIC CO. LTD. OF ENGLAND

Magnet House, Kingsway, London, W.C.2.



What oiled the wheels at Dybböl?

When machinery was simple, lubrication was simple too. Denmark's historic mill at Dybböl in South Jutland ground the country's corn for generations, its vast transmission protected by the most primitive of greases. In those days no problem faced the operator comparable to those we meet today: but even when faced with the complexity of today's lubrication requirements he has an answer to them all, wherever he may be.

DANISH STATE RAILWAYS, which operate fast diesel trains throughout Denmark are among those who have found this answer. They solve their special lubrication problems by delegating them to the BP RAILWAY LUBRICATION SERVICE.

BP protects all Danish Railways' General Motors diesel locomotives with world-tested products that have proved their superiority in railways service. BP Energol IC-D40 used in these engines is listed by General Motors EMD in their "Considerable Usage" category. It is exclusively used in the GM-Nohab locomotives.

BP Railway Lubrication Service

MONTHLY BULLETIN

OF THE

INTERNATIONAL RAILWAY CONGRESS ASSOCIATION

(ENGLISH EDITION)

PUBLISHING and EDITORIAL OFFICES : 19, RUE DU BEAU-SITE, BRUSSELS

Price of this single copy : 80 Belgian Francs (not including postage).

Yearly subscription for 1960 { **Belgium . . . . . 700 Belgian Francs**
Universal Postal Union . . . . 800 Belgian Francs

Subscriptions and orders for single copies to be addressed to the General Secretary, International Railway Congress Association, 19, rue du Beau-Site, Brussels (Belgium).

Advertisements : All communications should be addressed to the Association, **19, rue du Beau-Site, Brussels.**

CONTENTS OF THE NUMBER FOR FEBRUARY 1960.

CONTENTS	Page.
I. **Transport on railway wagons of road-lorries and trailers loaded with goods. Questions arising from this mode of transport : the role of the road-hauliers; tariffs to be applied; characteristics of the railway rolling stock to be employed; installations for loading and unloading; use of single wagons, or of sets of wagons, or of complete trains for this kind of transport. Results already obtained and possibilities of extending this mode of transport.** (Question 3, Enlarged Meeting of the Permanent Commission, Brussels, 1960) : Report *(Austria, Belgium and Belgian Congo, Bulgaria, Cambodia, Czechoslovakia, Denmark, Ethiopia, Finland, France and French Union, Greece, Hungary, Italy, Lebanon, Luxemburg, Poland, Portugal and overseas territories, Rumania, Siam, Spain, Switzerland, Syria, Turkey, Viet-Nam, and Yugoslavia)*, by L. LOHIER . . .	105
II. **Special features of American tariffing,** by Dr. G. LOWE	197

CONTENTS *(continued)*. Page.

III. New Books and Publications :

Directory of Railway Officials and Year Book, 1959-1960 201
Reconstruction du Chemin de fer Trans-Vietnam *(Reconstruction of the Trans-Vietnam railway)* 201

IV. A change of **President for the Office for Research and Experiments of the International Union of Railways** 202

V. Monthly Bibliography of Railways 13

LIBRARY

OF THE

Permanent Commission of the International Railway Congress Association

READING ROOM : 19, rue du Beau-Site, Brussels.

Works in connection with railway matters, which are presented to the Permanent Commission are mentioned in the « Bulletin ». They are filed and placed in the library. If the Executive Committee deems it advisable they are made the subject of a special notice. Books and publications placed in the reading room may be consulted by any person in possession of an introduction delivered by a member of the Association.

Books, etc., may not be taken away except by special permission of the Executive Committee.

All original articles and papers published in the « Bulletin » are copyright, except with the consent of the Authors and the Committee.

The Permanent Commission of the Association is not responsible for the opinions expressed in the articles published in the « Bulletin ».

An edition in French is also published.

Vol. XXXVII. — No. 2. February 1960.

BULLETIN
OF THE
INTERNATIONAL RAILWAY CONGRESS
ASSOCIATION
(ENGLISH EDITION)

[656 .225]

INTERNATIONAL RAILWAY CONGRESS ASSOCIATION

ENLARGED MEETING OF THE PERMANENT COMMISSION
(BRUSSELS, 1960).

QUESTION 3.

Transport on railway wagons of road-lorries and trailers loaded with goods.

Questions arising from this mode of transport :

- **The role of the road-hauliers;**
- **Tariffs to be applied;**
- **Characteristics of the railway rolling stock to be employed;**
- **Installations for loading and unloading;**
- **Use of single wagons, or of sets of wagons, or of complete trains for this kind of transport.**

Results already obtained and possibilities of extending this mode of transport.

REPORT

(Austria, Belgium and Belgian Congo, Bulgaria, Cambodia, Czechoslovakia, Denmark, Ethiopia, Finland, France and French Union, Greece, Hungary, Italy, Lebanon, Luxemburg, Poland, Portugal and overseas territories, Rumania, Siam, Spain, Switzerland, Syria, Turkey, Viet-Nam, and Yugoslavia),

by L. LOHIER,

Ingénieur en Chef,
Chef adjoint de la Direction Commerciale de la Société Nationale des Chemins de fer Français.

FOREWORD.

The detailed questionnaire drawn up in collaboration with Dr. SCHRADER, Reporter for the English speaking countries, was sent, as far as the French speaking countries are concerned, to 67 Railway Administrations and 7 member organisations.

Amongst the 49 replies received, a distinction may be made between :

— 11 Administrations who replied to the questionnaire in full or partly, these being :

— the Austrian Federal Railways;
— the Belgian National Railways;
— the Lower-Congo to Katanga Railways;
— the French National Railways;
— the Mali Railways;
— the Abidjan-Niger Railways;
— the Greek State Railways;
— the Italian State Railways;
— the Angola Railways;
— the Swiss Federal Railways;
— the Czechoslovakian State Railways.

— 38 Administrations or organisations advised us that they were not in a position to reply to the questionnaire :

— the Belgian National Light Railways Company, Brussels;
— the « Compagnie Générale d'Entreprises-Electriques et Industrielles », Brussels;
— the Upper-Congo to the Great African Lakes Railways;
— Colonial Transport Office (O.T.R.A.-C.O.), Brussels;
— Rio Grande do Sul Railways;
— Danish State Railways;
— Aalborg private railway, Denmark;
— Spanish National Railways;
— Catalan General Railway Company;
— Compagnie des Chemins de fer Départementaux, Paris;
— Société Générale des Chemins de fer Economiques;
— Chemins de fer Economiques du Nord;
— Paris Transport Board;
— Chemins de fer Secondaires du Nord-Est;
— Algerian Railways;
— Gafsa Railways;
— French Equatorial Africa and the Cameroons Railways;
— Morocco Railways;
— Mediterranean to Niger Railway;
— Viet-Nam Railways;
— Royal Cambodian Railways;
— Hungarian State Railways;
— North of Milan Railways;
— Venitian Company for the Construction and Operation of Secondary Railways in Italy;
— Luxemburg National Railways;
— Polish State Railways;
— Portuguese Railways Company;
— Benguela Railways;
— Bernese Alps Railways, Berne;
— Rhaetian Railway;
— Emmental-Burgdorf-Thun Railway;
— Syrian Railways;
— Damas Hama Railways and extensions;
— Turkish State Railways and Harbours;
— Jugoslavian Railways;
— Union d'Entreprises Suisses de Transport;
— International Union of Railways;
— International Railway Transport Central Office.

* * *

CHAPTER I.

GENERAL.

The present report is concerned with the *commercially organised* traffic in loaded or empty road vehicles set aside for the transport of freight, and not for occasional transport.

The replies to the questionnaire received from the above Railway Administrations showed that :

1) the Austrian Federal Railways, the S.N.C.B., the S.N.C.F., the Mali Railways and the Abidjan-Niger Railways, the Italian State Railways and the Swiss Federal Railways have studied to a greater or lesser extent the question of the transport of road vehicles;

2) that amongst these Administrations, the Austrian Federal Railways, the S.N.C.F., the Mali Railways, the Abidjan-Niger Railways and the Italian State Railways have completed their investigations and have organised the commercial working of this type of transport to a greater or lesser extent.

It may therefore seem that it was somewhat premature to include the question which is the subject of the present report on the agenda. But on the contrary, we consider that this was a very well chosen moment to begin to examine the motives which may lead railways to organise the transport of road vehicles.

The first motive may lie in the desire to assure *door to door transport without disturbing the load* at the stations, and thereby reduce the cost. The inherent difficulties of rail transport are well known as are the various measures that are taken to mitigate them :

— the development of private sidings and their possible replacement, wagon-carrying trailers;

— the use of combined rail-road vehicles : containers, dual purpose rail-road vehicles and, this is the category in which they must be included, road vehicles carried on wagons;

— mechanisation of handling operations during transhipment at the stations, especially the use of privately owned wagons adapted to the kind of goods carried and their loading and unloading.

A second possible motive is to *combat competition* from road transport by assuring the transport of road vehicles by rail under conditions as regards speed, regularity, safety and price which will make this combined service competitive.

Where then do the railways stand ?

They will check first of all if any motives exist making it desirable to carry out such a study and will analyse them.

If such an examination leads to the conclusion that in principle the transport of road vehicles by railway wagons is desirable, they will then study :

— the technical possibilities of its realization;

— the costs;

— the tariffs to be applied, and the operating methods to be used.

This will at once bring out the determining factor in the case of such studies of the data proper to each country, in particular :

— the existence or not of road competition, and in the first case, the relations between the two methods of transport and the customs and attitude of the road transport undertakings;

— the influence of geographical conditions (extent, configuration), railway conditions (structure and development of the railway system) and economic conditions (position of the regions to be served, traffic currents, volume of traffic to be carried) obtaining in the country on the organisation and profitability of the proposed transport.

* * *

It is this diversity of national characteristics which is responsible for the heterogeneous methods that have been adopted to date.

Thus the *Austrian Federal Railways* (Ö.B.B.) studied for the first time in 1949 the problem of combined traffic and were able to organise in 1950 the first such traffic on the Feldkirch-Vienna line (697 km). In 1952, a further such service was introduced on the Bludenz-Vienna line (677 km). In both case, it is a question of « piggyback » (« Umsetzverkehr ») traffic where the road vehicles (trailers) on their own wheels are loaded onto and transported by ordinary flat wagons.

The experience that the Ö.B.B. have obtained by operating this piggyback traffic has been invaluable. The technical side of combined traffic did not present any special problems, as installations suitable for loading the vehicles were already available at all the stations concerned and the transport itself did not involve any special additional conditions. On the other hand, from the commercial point of view, the very high tare of the consignment had a very serious effect on the cost of the transport. Consequently, in order to make the traffic a paying proposition for the consignor, considerable price reductions had to be granted for all consignments of this kind in the form of a special tariff.

The existing lack of balance in the transposed traffic was also a burden on profits. As a result, the Ö.B.B. recognised the value of trying to balance the traffic in each direction; however, it is rarely possible to do so, owing to the diversity of the economic requirements of the different firms. Yet, if it is not possible to organise

some traffic for the return run, the long empty runs considerably increase the cost.

From the commercial point of view, all these drawbacks can only be made up for if the journey is sufficiently long (about 400 km). If this is so, thanks to the relatively high transport receipts obtained in the case of full train loads (« Vollsendung »), it is a profitable commercial proposition even with a high tare and empty run on the return journey. In view of the conditions obtaining in Austria, this means that piggyback traffic is only economic in the east to west direction, between Vienna and the Tyrol as well as the Vorarlberg. It is true that is precisely on these lines that there is no great interest, as experience has shown, in organising such combined traffic. As a result on the interior services between Vienna-Linz-Salsburg-Gratz-Villach, where the traffic is the heaviest, no piggyback traffic has been organised to date. In the case of international traffic, the need to introduced combined traffic has not yet made itself felt; but here again the costs would be met owing to the greater distances involved.

The *Belgian National Railways* studied in 1955 questions connected with the cost and perspectives of working the transport of road vehicles on wagons.

It was seen that the maximum tariff which could be applied without making the combined transport dearer than road transport from end to end would not cover the marginal railway costs except in the case of distances where, in the case of internal traffic, there is no regular traffic that is more or less balanced in each direction, these marginal costs themselves being based on ideal conditions : carrying wagons used every day without any empty runs, including them in existing fast goods trains, very little adaptation of rolling stock and installations required, etc.

Under these conditions, it was considered advisable not to continue with these studies, especially from the technical point of view, but to be prepared to resume them should the need make itself felt in the case of traffic over sufficiently long distance in the case of international traffic.

The S.N.C.B. reports, however, for information, that they carry, in the case of two international services with France, U.F.R. semi-trailers (which will be dealt with further on), which are carried on privately owned wagons. From the tariff point of view, the semi-trailer is considered as the body of a covered wagon, so that the tariff is based solely upon the weight of the goods carried, deducting the allowances for transport in privately owned wagons; the charge for the return empty run is based on the tare of the wagon and the weight of the semi-trailer.

Three essential reasons led the *French National Railways* to study the problem of transporting road vehicles on wagons :

— first of all, the desire to improve the services offered by assuring door to door transport without transhipping the goods at stations;

— then the preoccupation of meeting intense road competition because of the great liberty this enjoys under the present legislation;

— finally, the desire to form an association between railway and road by operating combined transport and thus obtain technical co-ordination.

These studies led to the introduction of commercial services, which have considerably increased and whose possibilities as regards future development are still great.

The studies of the *Federal Mail Railways (Dakar-Niger)* were based on two ideas :

a) on the one hand, the improvement of the profitability of this type of transport by encouraging clients to entrust to the railway loaded road vehicles as well as empty ones.

The loaded vehicles in question are lorries. The principal consignors are :

— the Army;

— the Mines Department, certain departments of which are responsible for carrying out mining prospecting in the jungle and consequently have to take with them all their instruments and equipment;

— the Waters and Forestry Service;
— the insect pest control service, which travels from Dakar with all its equipment to wherever there is a plague of locusts;
— certain firms responsible for road construction or sinking wells in the interior of the country;
— certain private individuals or business firms carrying out their private transport.

Such transport has made it possible to increase the tonnage of the loads carried by flat wagons as well as to improve the coefficient of user of the latter, but such results are quite apart from those which might be considered when fighting road competition;

b) on the other hand, to fight road competition.

Studies have been made to recover the traffic on the Dakar-Saint-Louis run, the railway line which suffers the most from competition. This recovery was aimed both at the local traffic on this run and on the transit traffic to Mauritania.

The recovery of the local traffic was obtained by making suitable tariff agreements, on the one hand, and by introducing delivery services on the other. This experiment was so successful, that it made it unnecessary to carry lorries on wagons.

The recovery of the traffic to Mauritania and the reduction in handling costs at Saint-Louis, the rail-road junction station, was proposed by means of rail-road trailers. But the road hauliers concerned would not agree to this proposition for local considerations.

The *Abidjan to Niger Railway* has studied and made trials in connection with transporting road vehicles on wagons by means of an associated company, the African Company of Auxiliary Transport (A.T.A.).

The three stages (studies, trials, commercial working) have been completed. But owing to its operating losses, the A.T.A. has ceased its activites and its stock has been liquidated.

The *Italian State Railways* mention that they carried out practical trials of M. MARINI'S system, and this will probably be tried out on the F.S. system (on the line linking up Milan and the centre of the Puolie). M. MARINI'S system, known as FERAUT, is aimed at obtaining combined rail-road transport by simply carrying on the wagon the actual body of the road vehicle, thus saving transporting any unnecessary parts either by rail or by road. They are also studying carrying semi-trailers with special characteristics on slightly modified wagons.

The *Swiss Federal Railways,* for their part, told us that neither they nor any of the private Swiss Companies have any knowledge of the transport of loaded road vehicles apart from taking them through the Alpine tunnels of the St. Gothard, Loetschberg and Simplon.

The distances to be covered in this country being relatively short, there is no need for the transport on wagons of road vehicles and trailers loaded with goods.

The *Czechoslovakian State Railways,* finally, have not studied to date the problem of transporting road vehicles on wagons as one way of improving the transport economy.

* * *

CHAPTER II.

TECHNICAL QUESTIONS.

To solve this problem on the technical plane, the first idea which naturally comes to mind is to load existing road vehicles on the ordinary flat wagons belonging to the railway.

Three essential difficulties are at once apparent :

1) is the unit « road vehicle loaded onto a wagon » compatible with the railway traffic regulations, especially as regards the railway loading gauge and axle loads ?
2) can the road vehicle be loaded onto the wagon in a simple, rapid way ?
3) can it be secured on the wagon in an effective way ?

I. The factors of the problem.

A. *Railway loading gauge.*

This is the dimensions within which all the wagons, whether loaded or not, must keep.

This loading gauge differs appreciably in the various countries.

On the *Austrian Federal Railways,* except for local lines in the Vienna region, there is only one loading gauge (Appendix II — 1 — Curve A).

On the *Belgian National Railways,* there is only one loading gauge for all the lines (Appendix II — 1 — Curve B).

The railway loading gauges allowed on the *Lower-Congo to Katanga Railways* (curve A), *Mali* (curve B), *Angola* (curve C) are shown in Appendix II — 2).

The *Greek State Railways* use the gauge recommended by the Technical Standardisation Office (Appendix II — 1 — Curve C).

The *French National Railways,* in the case of all parts of empty wagons or wagons loaded with road vehicles more than 400 mm above rail level, take exclusively into account the general international loading gauge, the outlines of which and conditions of use are clearly shown in the U.I.C. (I.R.U.) documents (Appendix II — 1 — Curve C).

In the case of parts less than 400 mm above rail level, the S.N.C.F. takes into account :

— either, again, the international general loading gauge (Curve C_1) :

— or, in the case of certain special wagons described later on, (S.E.G.I. wagons) a gauge for the low parts allowing additional clearances :

  — Diesel units gauge defined by U.I.C. (I.R.U.). Note No. 506 (Curve C_2);

  — French loading gauge for low parts (Curve C_3).

In the case of every wagon, the S.N.C.F. takes into account such obstacles as track brakes, with jaw type wheel brakes, in certain marshalling yards.

The *Italian State Railways* make use of a single loading gauge (Appendix II — 1 — Curve D).

On the S.N.C.B., the S.N.C.F., and the F.S., the *reductions in width* imposed upon loads are calculated as a function not of the length of the wagons, but of the wheelbase of the outer axles or pivots of the bogies and the distance of the loaded section from the outer axle or nearest pivot.

Such reductions must be calculated from the formulae in Article III of the Railway Technical Standardisation (1938 edition) contained in the U.I.C. (I.R.U.) leaflet « Extract from technical Standards, construction of vehicles ».

In practice, the S.N.C.B. apply the reductions in width to loads given in Tables I and II of Appendix II to R.I.V. (pp. 106 and 107) (Appendix II — 3).

B. *Characteristics of open wagons belonging to the commercial stock.*

These are essentially variable according to the Administrations and year of construction. For example, let us review those of the J Q hors standard U.I.C.-O.R.E. 4-wheeled flat wagon of the S.N.C.F. :

overall width	13.86 m
usefull length of platform	12.62 m
useful width	2.77 m
height of floor above rail level (empty)	1.24 m
wheelbase	8.00 m
tare	12.5 t

C. *Total permissible load in the case of a road vehicle loaded onto a wagon.*

This depends upon the diameter of the wheels, the type of permanent way and the speeds allowed on the line. The general regulations are contained in R.I.V. (§ 26-6, Appendix II — §§ 1 to 4, Appendices V and VI). Certain Administrations allow less stringent regulations for internal services.

D. *Regulations concerning the characteristics of the road vehicles.*

These characteristics are governed by the regulations in force in each country. The

replies received from the various Administrations have been collected together in the Table given in Appendix II — 4. We have added to this, for information, those laid down at the 1949 International Convention, a Convention ratified by seven countries (Belgium, France, Greece, Italy, Luxemburg, Netherlands and Jugoslavia); although this came into force on the 1st July 1952, only three countries (Belgium, Luxemburg and Jugoslavia) communicated the list of roads open to vehicles whose characteristics agree with those of this convention.

E. *Existing stock of road vehicles in each country and tendencies of the users.*

Within the framework of the regulations mentioned under D above, the users select the types of road vehicles according to the kind of goods to be carried, the length of the run, the structure of their undertaking, the costs, etc.

In this respect, the Administrations supplied the interesting information which has been collected together in Appendix II — 5.

In *Austria,* on the 1st April 1959, there were in service 819 590 motor vehicles and 52 206 trailers. Amongst these motor vehicles, there were 69 134 lorries, 106 306 tractors, 9 227 special motor vehicles and 816 three-wheelers.

The information asked for concerning the division of these motor vehicles as between public and private transport as well as the useful load is only known for the year 1957 (as at the 31st October). However, the number of vehicles licensed to run on the roads on the 31st October 1957 has only increased since that date by some 4 000 lorries, not a very high figure, so that the figures given in Table A of Appendix II — 5 can still be used as a basis for this present year.

The question of knowing what types of vehicles predominate for certain transport distances, owing to the lack of the necessary statistics, can only be dealt with by the general statement that lorries with a low load capacity are only used for short distance traffic.

In *Belgium,* the distribution of the motor vehicles asked for is not known. In Appendix II — 5 — Table B, are listed the few details known by the S.N.C.B. regarding the composition of the road vehicles in use in Belgium.

As regards the preference of road hauliers for one or other type of vehicle, it can be stated that they prefer vehicles with a high load capacity, for reasons of cost.

As for the predominance of one or other type of vehicle over given distances, the S.N.C.B. is unable to form any judgement owing to the lack of more precise information. It appears that in general the useful load preferred by the hauliers is the higher the greater the distance to be covered.

The information concerning *Greece* is given in Table C.

In *France,* the distribution of the road vehicles is as shown in Table D. Note in particular :

— the relative importance of semi-trailers in the high tonnage classes :

  6 300 semi-trailers with a useful load capacity of more than 13 t;

  compared with :

  4 200 lorries having a useful load capacity of more than 13 t;

  i.e. 50 % more semi-trailers;

— in this category, there is a tendency, especially in the case of public transport services, for the hauliers to prefer articulated vehicles to lorries, owing to the greater flexibility in working : thus during the last two years, the numbers of lorries of more than 13 t has increased by 5 %, whilst the number of semi-trailers has increased by 85 %

— lorries definitely predominate in the case of average tonnages (9 to 12.9 t).

The distribution of road transport according to the types of vehicles is as follows :

	from 50 to 150 km	*from 150 to 400 km*	*400 km and over*
Lorries	85 %	72 %	66 %
Trailers	3 %	6 %	11 %
Semi-trailers	12 %	22 %	23 %

In *Italy*, the F.S. have no data on which to decide the preference of the road hauliers for the different types of vehicles. It is noted however that in general the heavy vehicles predominate in the case of long distance transport, and that articulated vehicles are used above all for the transport of liquids, especially petroleum products.

The distribution of the existing stock in *Switzerland* is shown in Table E of Appendix II — 5. In general, it is noted that there is a very definite preference for lorries and 2 or 4 wheeled trailers, semi-trailers being practically unknown. In addition, the longer the distances to be covered, the greater the tendency to make use of heavy sets of road vehicles.

In the *Mali Federation*, the position of the existing stock (Table F of Appendix II — 5) shows that the lorry clearly predominates with a relatively low useful load, and that articulated vehicles are used to about the same extent as lorries for heavy loads.

Finally, the information concerning the territory run through by the *Abidjan-Niger Railways* are shown in Table G in Appendix II — 5.

F. *The relative importance of the traffic by rail and by road.*

In *Belgium*, no official figures for the road traffic are available. The following estimates of the S.N.C.B. concerning the total road traffic for the year 1958 are given with some reservation :

— tonnage carried : 175 millions t;
— tonnes-km : 6 000 millions;
— respective percentages of rail + road traffic :
rail : tonnage, 25 %; t-km, 49 %;
road : tonnage, 75 %; t-km, 51 %.

In *France*, the distribution of the traffic between rail and road is as follows :

	Years							
	1949	*1951*	*1952*	*1953*	*1954*	*1955*	*1956*	*1957*
Transport of goods by road :								
- tonnes (millions)	86.8	—	108	117	136.7	147	155	162
- t-km (thousand millions)	8.4	—	10.5	11.5	13.4	14.7	15.5	16.2
Respective percentage of goods traffic :								
- rail	83 %	—	81 %	78 %	75.5 %	76 %	76.5 %	77 %
- road	17 %	—	19 %	22 %	24.5 %	24 %	23.5 %	23 %

II. The problem to be solved.

It is quite clear, as far as the loading gauge is concerned, from figure 1 below where we have shown within the U.I.C. gauge an ordinary road vehicle, 3.80 m high (maximum laid down by the Geneva Convention) loaded onto an open wagon of the O.R.E. type: unbroken line, it is exactly centered on the wagon; dotted line, it is taken as being 10 cm off centre compared with the axis of the vehicle, to show the incidence of the cut off corner of the railway gauge. Moreover, we must hasten to make it quite clear that the effective heights of road vehicles are very variable, and that the problem thus raised is often one of limits.

In addition, it should also be noted that the greater the error in centering the vehicle, the more reduced the clearance space available for the road vehicle. Hence the interest of finding some way of reducing the possibility of such error.

Moreover, the wagon loaded with the vehicle must have a total weight loaded and distribution of the load compatible with the railway traffic regulations.

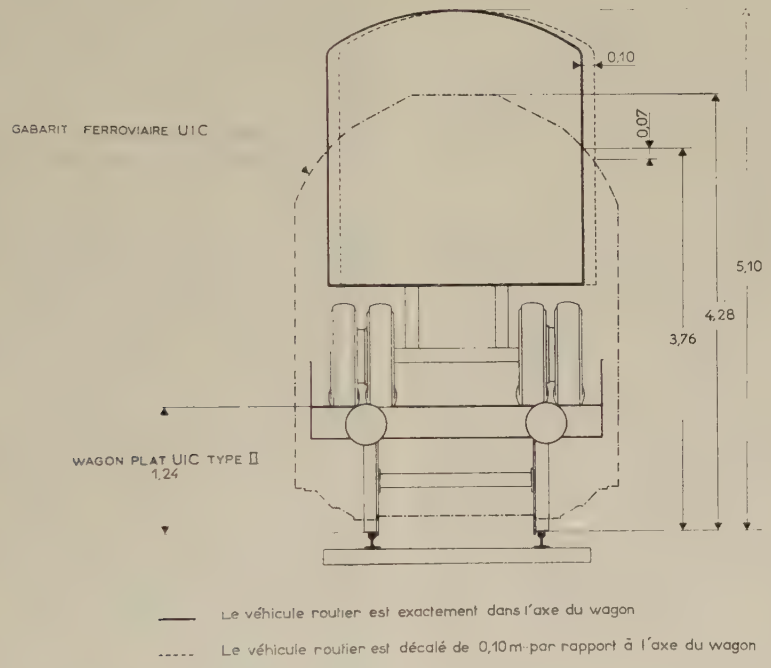


Fig. 1. — The problem of loading an *ordinary* road vehicle on an *ordinary* flat wagon.

N. B. — Gabarit ferroviaire U.I.C. = U.I.C. railway loading gauge. — Wagon plat U.I.C. type II = U.I.C. type II flat wagon.

———— The road vehicle is centered exactly on the wagon.

- - - - - - - - The road vehicle is 0.10 m off center.

Again, in the case of semi-trailers transported without their tractors, the loading has to take place by backing the trailer onto the wagon, so that the tractor can be uncoupled : this is a long and delicate operation, so it would be of interest to find some easier method.

Finally, the wedging device used must be effective and easy and quick to put in place.

III. The solutions.

How therefore are we to solve the problem of keeping the vehicle loaded onto a wagon within the limits of the railway loading gauge ?

Three solutions have been put forward :

1) to modify the characteristics of the road vehicle without affecting those of the wagon, at least to any appreciable extent : this can be done either by reducing the height of the chassis and by housing the wheels in the floor of the road vehicle, or by removing the wheels from the chassis during the railway journey. The advantage for the railway is that this means a wagon that can be in common use or very nearly. The drawback is that the road vehicle must be a special type for combined transport, which increases its price, limits its possibilities of use, and possibly leads to a certain hesitation on the part of the public road transport firms;

2) to adopt a special wagon which can carry an ordinary road vehicle. In practice, an examination of the standards laid down in the regulations in force in the various countries shows that certain road vehicles would fail to pass the railway loading gauge even if they were running directly on the rails. In fact it has become necessary to make a distinction between 2 cases :
   — that in which the wagon is sufficiently low to be loaded with vehicles having characteristics identical or very close to those of the existing road vehicles : in this case we have a road vehicle which is very little or not specialised at all and a highly specialised wagon;
   — the wagon is not low enough and a fairly thorough modification of the characteristics of the road vehicle is also necessary : both will therefore be specialised;

3) to adopt a combined vehicle which can run on both road and rail.

What solutions have been adopted by the Administrations covered by the present report ?

The *Austrian Federal Railways* have adopted the solution of a special road vehicle carried on an ordinary open wagon.

In the case of the combined traffic between Vienna and Feldkirch, the goods are carried loaded onto carrying road vehicles. These vehicles are trailers (4.85 m long; 1.75 m high; 2 m wide; useful load : 5 200 kg; tare : 3 272 kg; two axles), and are fitted with a body with sliding doors.

In Vienna, the collection and delivery department of the Ö.B.B. brings up the trailers at the station and at Feldkirch, the client takes them away. The consignments (2 trailers each time) are loaded onto any wagon suitable for the transport.

In combined traffic between Vienna and Bludenz, the goods are loaded in « Swiss Containers » (manufactured by « Felschlöeschen » : length : 2.70 m; height : 2.47 m; width : 2.34 m; useful load : 5 136 kg; tare : 1 864 kg; two axles), carried on wagons specially designed for this traffic (2 axles, 8 m, wheelbase, 20 t useful load, 13 t tare, with hand brake, 10.66 m length available for the load, 2.67 m width available, and 1.99 m height for the load). Three vehicles can be loaded on these wagons at right angles to their axis. In Vienna, the trailers are brought up and taken away by the Ö.B.B. haulage services, and at Bludenz by the clients.

The road vehicles are loaded by means of a ramp or with a crane.

The vehicles are fastened on the wagon by steel rubber covered cables and by chains.

The three solutions studied and retained by the *French National Railways* are :

A) *special road vehicle* (semi-trailer) transported an *a slightly adapted wagon;* U.F.R. (1) wagons and semi-trailers are used with side steering. Each 2 axled wagon takes two semi-trailers of average capacity or one of high capacity (Appendix II — 6). This has been a regular commercial practice for several years;

B) *non-specialised road vehicle* (lorry, tractor or trailer) carried on a *special wagon;* this is the solution of the S.E.G.I. (2) low loading wagon on which a heavy lorry or two tractors can be carried (Appendix II — 7);

C) *slightly modified road vehicle* (semi-trailer) carried on a *special wagon;* using the S.E.G.I. *Kangaroo* solution, a semi-trailer, slightly modified, can be loaded on a special two-axled wagon with an inclined floor falling towards a central hollow (Appendix II — 8).

Solutions B and C, which are much more recent in use, are the object of regular commercial services with a limited number of wagons.

Solutions A and C cover the transport of semi-trailers without their tractor. This obviously is the most rational solution, as it assures the best ratio of :

$$U = \frac{\text{available useful load}}{\text{wagon tare} + \text{total weight loaded of vehicle authorised.}}$$

For example :

— with two U.F.R. semi-trailer vans of 7.5 useful load, loaded on a U.F.R. flat wagon, we get :

$$U = \frac{7.5 \times 2}{10.3 + (7.5 + 3.5) \times 2}$$

$$= \frac{15}{32.3} = 0.461;$$

— with one U.F.R. tank semi-trailer, holding 200 hl of wine, we get :

$$U = \frac{19.8}{10.3 + 19.8 + 5.9} = \frac{19.8}{36} = 0.55;$$

— with a two wheeled semi-trailer van of 19.5 t useful load carried on a S.E.G.I. *Kangaroo* wagon, we get :

$$U = \frac{19.5}{10.5 + 25} = \frac{19.5}{35.5} = 0.55;$$

— with a four wheeled semi-trailer van of 22.5 t loaded on a S.E.G.I. *Kangaroo* wagon and running on an ordinary goods train (P.V.) we get :

$$U = \frac{22.5}{10.5 + 29} = \frac{19.5}{35.5} = 0.57;$$

With a S.E.G.I. low loading wagon, this ratio becomes, in the case of a lorry with tarpaulin of 15 t useful load :

$$U = \frac{15}{16 + 26} = \frac{15}{42} = 0.357.$$

A comparison of the value of U for a standard U.I.C. covered wagon ($\frac{24}{12 + 24} = \frac{24}{36} = 0.66$) shows that if the classic wagon is still the most advantageous, the use of semi-trailers loaded onto a wagon does not have any marked depressive effect on the value of U.

Finally, there is one special feature as regards the transport of semi-trailers which must be mentioned : loading such a vehicle onto a wagon has to be done by backing it up to enable the tractor to be uncoupled (lateral loading is difficult and involves

(1) U.F.R. : « Société pour l'Union des Transports Ferroviaires et Routiers ».

(2) S.E.G.I : « Société d'Equipement des Grands Itinéraires ».

	Tare			C.U.	Value of $U\frac{\text{col. 4}}{\text{col. 3+4}}$
	Wagon	Road vehicle	Total		
	1	2	3	4	
2 UFR semi-trailers loaded on UFR flat wagon	10.3 t	3.5×2 – 7 t	17.3 t	15 t	0.461
1 UFR tank semi-trailer loaded on UFR wagon	10.3 t	5.9 t	16.2 t	19.8 t	0.55
1 two-wheeled semi-trailer van loaded on Kangaroo wagon	10.5 t	5.5 t	16 t	19.5 t	0.55
1 four-wheeler semi-trailer van loaded on kangaroo wagon (in RO traffic)	10.5 t	6.5 t	17 t	22.5 t	0.57
— *standard UIC covered wagon* . .	12 t	—	12 t	24 t	0.66

Note : C.U. = Useful load.

the use of side platforms which are rarely found at S.N.C.F. stations, at least of sufficient length, and it would be very costly to build them). This operation, carried out on an ordinary flat wagon, is a difficult, lengthy job. This is why the U.F.R. and *Kangaroo* methods include a device for guiding the semi-trailer on the wagon, a device which besides making it possible to speed up the loading, makes it possible to make full use of the loading gauge, as the vehicle is automatically centred on the wagon.

The *Abidjan-Niger Railway* uses the U.F.R. system described above.

The FERAUT-MARINI solution being tried by the *Italian State Railways* includes removing the body of the road vehicle off its road chassis during the railway run.

This makes it possible, on the one hand, to reduce the dead weight carried, and, on the other hand, to increase the useful loading gauge available on the railway run.

The body is carried by rail on a specially designed wagon frame.

On the road, the body is carried on a special road trailer.

The transhipment of the road trailer from the wagon or vice versa is carried out by means of a fixed oleodynamic lifting installation : four hydraulic jacks, on either side of a railway line come into contact with the outside of the bottom of the body and lift it up. The wagon is then withdrawn and replaced by the road frame onto which the body is lowered by the jacks.

The body has a useful load of 20 to 22 tons and a useful volume of 40 m³.

In addition, the F.S. are studying a method of carrying semi-trailers with special characteristics on slightly modified wagons (Appendix II — 9).

* * *

CHAPTER III.

GENERAL ORGANISATION.

PART I.

REGULATIONS AND FISCAL SYSTEMS.

The interest in transporting road vehicles on wagons and the modalities governing their introduction obviously depend upon :

1) whether or not each Railway Administrations according to the regulations is allowed to organise road transport;

2) the regulations and fiscal regime applicable to road transport.

In this field, the distinction between public transport (or transport on behalf of a third party) and private transport (transport on ones own behalf) is of the greatest importance to the railways.

The transport of public transport vehicles corresponds to a method of fighting competition by the realisation of effective co-ordination.

The transport of private transport vehicles corresponds to the desire to recover or attach to the railway, traffic it has lost or risks losing, by offering clients a service which meets their requirements, especially as regards door to door services;

3) legislative measures or regulations in existence or under consideration in favour of combined rail-road transport.

1. Possibilities of the railway assuring road transport.

Such possibilities, shown in detail in Appendix III — 1, are as follows :

— in *Austria,* the Federal Railways only carry out road transport of goods within the framework of delivery services, the wagon carrying trailer services and the traffic replacing railway services in urgent cases;

— in *Belgium,* the S.N.C.B. can only operate the terminal delivery services by road;

— in *Greece,* the State Railways only assure the delivery services in certain large cities, either by their own lorries, or through road transport undertakings. The C.E.H. intend to extend this system as far as possible. In the case of large consignments, the C.E.H. sometimes undertake to transport over distances of more than 50 km, but these are perpendicularly to the railway, i.e. complementary to the railway transport. Such transport is entrusted to road transport undertakings;

— in *France* the S.N.C.F. :

a) is able to carry out or organise the terminal haulage services; such services are obligatory in towns of more than 5 000 inhabitants;

b) may be authorised by the Ministry of Public Works and Transport to carry out or organise the services on a line or section of line by some other method of transport;

c) is able to charter long distance road transport within certain limits;

— in the *Mali Federation,* the railways do not run road transport services with their own vehicles, but they have made agreements with road firms for operating certain services;

— the *Abidjan-Niger Railway* does not operate any road services and does not charter private transport to prolong its itineraries. The responsibility for doing this is left to the selected Agents;

— in *Italy,* the F.S. do not carry out any goods transport whether delivery services or « from end to end » by means of their own lorries; such services are assured by the National Transport Institute (set up by the F.S.) or private firms;

— in *Switzerland,* the Federal Railways only operate the terminal delivery services through official hauliers who have their own lorries;

— in *Czechoslovakia,* the State Railways have no road vehicles; road transport is worked solely by public or private road transport undertakings.

Thus, it appears that in practice the Railways do not operate any end to end road services.

2. Regulations and fiscal measures applying to road transport.

The transport of road vehicles is only concerned with their transport over a minimum railway run. To take into account the zoning in the case of the regulations and fiscal plan of the road transport zone, we have examined the

measures applied for road runs of more than 50 km.

In the various replies summed up in Appendix III — 2, the following essential characteristics may be mentioned :

— in *Austria,* all long distance traffic, i.e. that over more than 65 km as the crow flies from the premises of the transporter, is taxed as a function of the number of runs made and the useful load per vehicle used;

— in *Belgium :*

a) as far as the regulations are concerned, public transport of goods by road is subject to the authorisation of the Road Transport Office (O.T.R.). Each authorisation, granted after an enquiry, which takes into account in particular the needs of the users on the one hand, and the prevention of duplication on the other, is issued for a period of 5 years; it applies to a given vehicle up to its maximum authorised load. It may be valid for the whole country and all kinds of goods, or only for certain runs and certain goods.

Private transport requires no authorisation;

b) fiscally, goods transport is liable to an annual road tax based on the tare of the vehicle and in conjunction with certain reductions or increases;

— in *France* itself :

a) as regards the regulations, public road transport other than rural transport is divided up between long distance transport (over the whole country) and short distance transport (over a radius of approximately 150 km there is a short distance zone for each department), and haulage services (within the department with possibly a few extensions). They are subject to a quota, i.e. the transport potential in useful tons is restricted.

Private transport is free from any regulation;

b) fiscally, it is laid down :

— all vehicles must pay a general tax based on the total weight when loaded; this tax is reduced by 30 % in the case of semi-trailers;

— long distance vehicles also pay a surtax, which is a function of the total weight loaded and each fraction over and above 6 tons;

— in the *Mali Federation* public transport services are subject to authorisation from the competent Ministry, in order to limit the number and tonnage of vehicles, and by restoring order to road transport to establish a rational transport plan. Private transport is free.

Fiscally, transport has to pay :

— a petrol tax;

— a tax on each vehicle less than 10 years old;

— on the *Ivory Coast* and *Upper Volta,* served by the Abidjan-Niger Railway, public transport requires a transport licence for each vehicle; the number cannot be increased unless new economic needs arise. Private transport is free;

— in *Switzerland,* the fiscal regime varies from Canton to Canton;

— in *Czechoslovakia,* road transport over distances exceeding 50 km can only be worked by public road transport undertakings. There is no particular fiscal regime.

3. Measures in existence or under consideration in favour of combined rail-road transport.

In France, the U.F.R. semi-trailers used for combined rail-road transport are exempt from the fiscal surtax.

A similar exemption in favour of transport on S.E.G.I. wagons has been proposed to the Ministry of Public Works and Transport; according to this the daily surtax on the road vehicle which has travelled more than 600 km by rail will be remitted.

Under these conditions, a vehicle which has covered 60 000 km per annum by rail will be completely exempt from this tax; this distance of 60 000 km approximates to the annual railway traffic in U.F.R. semi-trailers.

* * *

PART II.

BASES FOR WORKING THE TRAFFIC IN ROAD VEHICLES LOADED ONTO WAGONS.

In view of these data, why and how is the traffic in road vehicles loaded onto wagons organised ?

The *Austrian Federal Railways* have introduced two forms of combined traffic in order to obtain practical experience in this field. In addition, running this traffic which before went partly by road, has made it possible to obtain additional receipts.

A profit from such techniques is assured by using wagons belonging to the railway.

The traffic now being dealt with only concerns full loads; there is no question of transferring the parcels traffic to this combined traffic. However, one firm is considering organising this type of traffic between Vorarlberg and Vienna for grouping goods.

The *French National Railways* were guided in their choice of the different solutions essentially by the need to recover or retain certain traffic where there was much competition and thus improve their receipts. But in so doing, they have been careful to co-operate with the road transport undertakings, as they consider that the solution of the problem of competition is to be found rather in constructive agreements between the different transport techniques than in sterile competition. In addition, they see therein the value of assuring door to door services for their clients.

The traffic assured by the techniques described above is solely concerned with full loads. The S.N.C.F. is not considering for the moment the use of this technique for the parcels traffic.

Under these conditions, after a trial period, they have put into commercial working :

— the U.F.R. solution in March 1941;
— the two S.E.G.I. solutions in April 1959.

Of these three solutions, the S.N.C.F. considers that :

— the U.F.R. and S.E.G.I.-Kangaroo techniques are the solutions of the future and complement each other; they cover the transport of semi-trailers and thus make it possible to avoid the amount of dead weight carried, and the more so the greater the useful load of the vehicle;
— the use of the low loading S.E.G.I.-wagon appears on the contrary to be merely a temporary solution; though reserved for the transport of heavy vehicles, technically it leads to the transport of a motor unit with a high tare. Why has it been retained ? The figures quoted in Appendix II — 7 explain why : amongst the 42 550 lorries and semi-trailers having a useful load of 9 t and over, there are 31 400 lorries, i.e. 73.8 % of the stock; in the case of public transport alone, lorries represent 15 300 units out of 21 200 vehicles (lorries and semi-trailers) of 9 t and over, or 72.2 %. The predominance of lorries amongst these heavy vehicles has therefore obliged the S.N.C.F. to retain a solution which facilitates the system of combined transport for ordinary vehicles and is giving the users sufficient time to replace their lorries by articulated units should sending them by rail appear to them to be a profitable business.

How are these techniques operated ?

U.F.R. solution.

This concerns both private and public transport; in practice, however, the latter represents 98 % of the traffic assured in this way.

The wagons are owned by the S.N.C.F. which has entrusted the working of this service to the « Société Française pour le Développement du Transport Mixte Rail-

Route » (SOFRAMIXTE) (1), which is not affiliated to the S.N.C.F.

The road vehicles are owned by the transport undertaking (public or private) which deals directly with the S.N.C.F. as far as the railway run is concerned.

A. *General regime.*

All U.F.R. semi-trailers are accepted for combined transport after being passed by the S.N.C.F., whose owners or hirers undertake only to use them for runs complementary to the railway run, as previously agreed with the railway.

There is however a tariff clause (tariff 107*bis* — heading II) allowing to exempt from this obligation in the case of semi-trailers having a useful load of more than 10 t: the benefit of the special tariff is then only granted as a refund according to the number of journeys made loaded each year.

B. *Special regime applicable to public transport undertakings.*

The public transport undertaking can sign a long term contract with the S.N.C.F. (10 or 15 years) according to article 39 of the decree of the 14th November 1949 and the decree of the 16th February 1957, which authorise the S.N.C.F. to « give financial aid to public road transport undertakings which agree to carry out by combined rail-road transport the traffic mentioned in their agreements.

The agreement in question can take two different forms:

— *type A agreement,* which is a contract concluded for a period of 19 years with renewal by tacit agreement.

The S.N.C.F. puts the wagons and necessary station installations at the disposal of the road undertakings free of charge.

They share financially in the purchase of the semi-trailers. This participation, the average value of which amounts to one third of the cost of the stock, varies according to the type. It consists of two parts:

— one, a function of the cost of the stock;

— the other, a function of the useful load of the vehicle and the level of tariff No. 107, i.e. a function of the receipts expected.

In return, the road transport undertaking:

— undertakes to send a minimum guaranteed traffic each year for 10 years, part of the receipts from which is destined to pay off the financial participation (if he cannot reach this minimum, he has to pay in money the necessary supplement to meet the agreed sinking fund charges);

— agree to the surrender of a tonnage of their long distance quota rights equal to the useful load of the semi-trailer divided by 1.2; for example a 7.5 tons semi-trailer must be covered by 6.25 tons of long distance quota rights. This coefficient of reduction is justified by the increase in the length of the railway run compared with the purely road run (increase due to shunting in the marshalling yards) and the reduced output resulting for the semi-trailers carried;

— *type B agreement* which differs from type A in the three following points:

a) they are concluded for a firm period of 15 years instead of 10 years, with renewal by tacit agreement;

b) the loan from the S.N.C.F. is being paid back over 15 years by 1/15ths instead of 10 years by 1/10ths;

c) the undertaking can, in addition, receive a loan from the treasury equal to half its financial commitment according to tariff No. 107, repayable as and when the undertaking wishes, but not later than the expiry of the Agreement.

Thanks to this system of Agreements, the railway, in view of the existing uncertainty of public road transport in France, is sure of obtaining a reduction in the potential of purely road transport since the contract involves the surrender of part of the transport quota rights.

(1) SOFRAMIXTE: « Société Française pour le Développement du Transport Mixte Rail-Route ».

S.E.G.I. (Kangaroo and low loader wagons) solutions.

For the moment, these are reserved for public transport services only.

The railway stock (wagons, movable ramps, tractors for shunting) belong to a Finance Company, the « Société d'Equipement des Grands Itinéraires (S.E.G.I.) » set up for this special purpose, shares in which are held, in addition to the S.N.C.F. (through its affiliated company the S.C.E.T.A.) (1) by the builders of road vehicles (lorries and semi-trailers), two organisations linked with the railway (the SOFRAMIXTE Co. and the « Compagnie Nouvelle de Cadres ») and the banks.

This stock is put at the disposal of a commercial operating undertaking, which was also instituted for this special purpose, the « Société de Traction et d'Exploitation de Matériel Automobile (S.T.E.M.A.) », which consists of professional road hauliers who hold the majority of the shares, the S.C.E.T.A. and the SOFRAMIXTE.

The S.N.C.F. in carrying out the railway transport deals solely with the S.T.E.M.A.

The road vehicles belong to public transport undertakings who send them to the S.T.E.M.A. and deal with this latter in the case of the rail transport.

Thus, unlike the case of the U.F.R. method, the S.N.C.F. has no contact with nor is bound by any agreement with the road transport undertaking which remains free to make use of the combined transport when it wishes and with whatever type of vehicle it wishes (lorry, articulated vehicle or semi-trailer alone); however, the charge for the transport is a function of the service given i.e. depends upon the gross weight of the vehicle.

Moreover, vehicles are only accepted for transport on wagons when they are covered and accompanied by the same transport licences as if they were on the road. The S.N.C.F. is thereby assured that the transport potential of the undertaking in question is not increased but on the contrary part of the traffic which otherwise would go entirely by road now goes by rail for some part of the way.

On the *Abidjan-Niger Railway,* the railroad solution has been introduced to attract to the railway the traffic in products (coffee, cocoa) harvested at some distance from the railway (between 10 and 100 km), which were lost to the railway to a great extent due to the advantages of door to door services by road.

The traffic is concerned with agricultural products in one direction (coffee, cocoa) and with various goods in the other direction (usually grouped consignments).

The working has been entrusted to the « Société Africaine des Transports Auxiliaires » (A.T.A.), an affiliated company of the railway, which rents the specially adapted wagons to the latter and owns the road material (U.F.R. semi-trailers and tractors).

The seasonal character of the traffic and the fact that the semi-trailers are not adapted to the long runs (sometimes more than 100 km) which have to be made after the rail journey on roads which are merely earth tracks led to this service having to be given up.

There is no question in the near future of considering on the technical plane some other formula for combined rail-road transport : the agreements made with the Agents on the commercial plane allow use to be made of the solution of transhipment at the stations at each end of the run.

In *Italy,* the MARINI organisation which put forward the Feraut system is a private company in the setting up of which the railway has no share. The economical relations between the F.S. and this company will be fixed as required should the experiments mentioned above be completed.

* * *

CHAPTER IV.

WORKING.

In the case of each Administration, we will make a distinction between the organisation of :

(1) S.C.E.T.A. : « Société de Contrôle et d'Exploitation de Transports Auxiliaires ».

A. The rail transport;
B. The terminal road transport journeys;
C. The terminal rail-road installations.

* * *

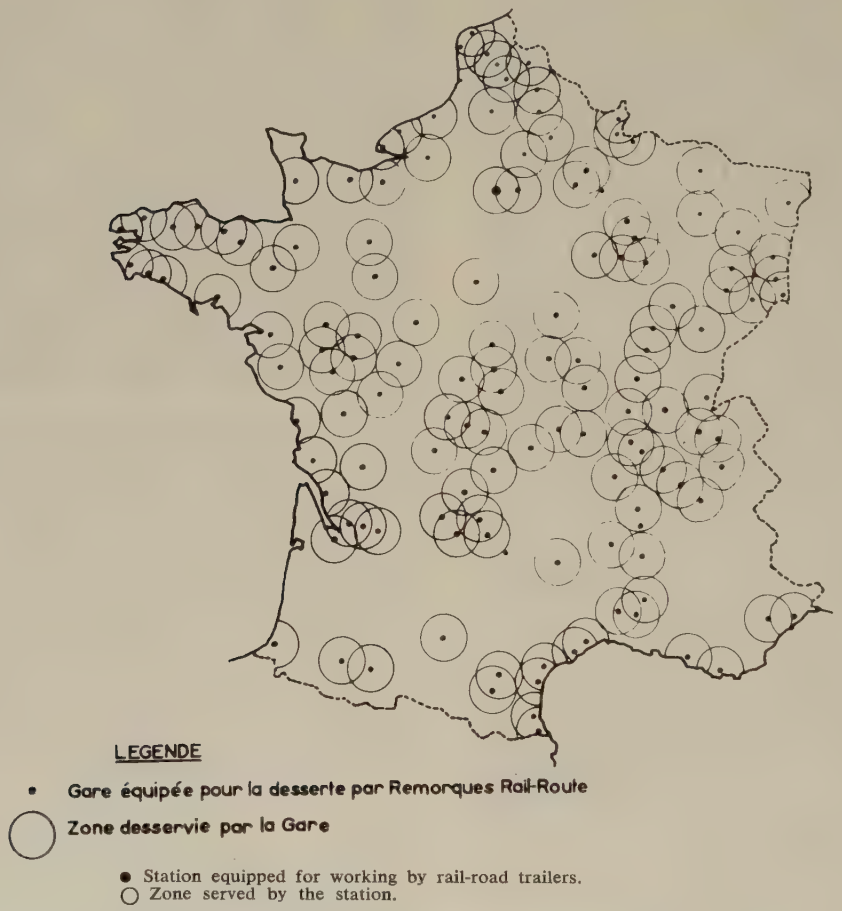

LEGENDE
Gare équipée pour la desserte par Remorques Rail-Route
Zone desservie par la Gare
Station equipped for working by rail-road trailers.
Zone served by the station.

Fig. 2. — Organisation in France for operating by U.F.R. rail-road semi-trailers.

On the *Austrian Federal Railways :*

A. *Railway transport.*

As already mentioned, the combined traffic at the present time only concerns the Vienna-Feldkirch (697 km) and Bludenz-Vienna (677 km) runs; no other railway Administration therefore shares in this traffic.

Owing to the small amount of traffic, the railway transport is assured by isolated wagons included in the ordinary parcels trains. The length of the railway journey is 28 to 30 h, which corresponds more or less to that of the lorry in the case of door to door services. The total rail transport time, including delivery, is practically the same as that of a direct road journey.

The combined traffic is only concerned with road vehicles without motor units; consequently, no drivers have to travel with the road vehicle.

B. *Terminal road transport.*

The road vehicles are taken away at Vienna by tractors belonging to the Ö.B.B. delivery services, and at Bludenz and Feldkirch by tractors belonging to the railway clients. The organisation therefore is the responsibility of the delivery services in Vienna and in the two other cities of the clients.

C. *Terminal rail-road installations.*

The installations required for this traffic were already in existence at all the stations concerned.

The work of loading and unloading the wagons as well as securing the road vehicles is carried out by the Ö.B.B. delivery services at Vienna and by the clients at Bludenz and Feldkirch.

The weight of the consignment is determined by the principles used in the case of full wagon loads (weighed after being loaded).

* * *

In the case of the organisation on the *French National Railways,* a distinction must be made between the U.F.R. and the S.E.G.I. solutions :

U.F.R. solution (transport of special semi-trailers).

A. *Rail transport.*

This is carried out in isolated wagons included in the ordinary fast goods trains (G.V.) and no modification is expected to be made in this method in the future. The traffic between the some 160 stations equipped for such traffic (fig. 2) covers the greater part of France. It should be noted that 50 % of the traffic is carried on the electrified lines where the cost is lower.

The time taken for the rail journey varies according to line; the S.N.C.F. quotes as an example certain services on which semi-trailers of this type are carried :

Consigning station	*Destination station*	*km*	*Time and day of departure*	*Time and day of arrival*
Lorient	*Paris-Vaugirard*	518	16 h 30 day A	1 h 15 day B
La Souterraine	*Paris-Austerlitz*	341	19 h 40 day A	0 h 43 day B
Perpignan	*Lyon-Perrache*	490	15 h 00 day A	2 h 30 day A
Boulogne	*Marseille*	1 090	20 h 15 day A	21 h 45 day B
Cholet	*Mulhouse*	812	19 h 39 day A	1 h 30 day C
Bordeaux	*Paris*	588	21 h 20 day A	9 h 45 day B
Lyon	*Paris*	498	22 h 32 day A	6 h 10 day B
Marseille	*Paris*	829	20 h 00 day A	14 h 30 day B

No arrangements are made to transport the drivers.

B. *Terminal road transport.*

The terminal road transport, according to the terms of the legislation on co-ordination, may come within the haulage area of the consigning or destination station, i.e. within the department; in practice, the terminal road transport in most cases is less than 20 km.

In every case, the terminal road transport

is at the expense of the *road transport undertaking* using the vehicle.

The road transport undertakings who operate U.F.R. semi-trailers have set up a company, the « Groupement des Transporteurs Mixtes Rail-Route (G.T.T.M.) ». These elect an agent, in each of the stations equipped to deal with this traffic, who is a member of the G.T.T.M., who undertakes to deliver the semi-trailers of other members at the agreed rates. The Group only intervenes to the extent of appointing this agent; the transmission of orders and charging for the services rendered are carried out directly between the hauliers and the agent.

C. *Terminal installations for the rail-road traffic.*

The necessary installations (straight sections of line, platforms, centering devices, parking areas, etc.) are built by the S.N.C.F. at its own expense and put at the disposal of the G.T.T.M. free of charge.

The latter, either directly in the large cities, or at other centres through the agreed agents, run these installations. In particular, they carry out :

— the loading of the semi-trailers on the wagons, and their unloading;
— the securing of the vehicles on the wagons;
— consigning formalities.

Checking the weight of the consignment is done by weighing :

— either the semi-trailer itself on a weigh-table where there is one;
— or the loaded wagon on a weighbridge in other cases.

The U.F.R. semi-trailers are designed for transport on a railway wagon and must be first passed by the S.N.C.F.; that they have been passed is shown by a mark painted on the vehicle. Provided the vehicle is so marked, no other check that it will clear the loading gauge is necessary.

D. *Commercial organisation.*

The commercial prospection of the public road transport services is assured conjointly by the S.N.C.F. and the G.T.T.M.; the latter offers all new undertakings the fruit of its experience and assists them to study the possibilities of setting up combined rail-road services (traffic concerned, type and number of semi-trailers that will be required, choice of station to be used).

In general the G.T.T.M. :

— in agreement with the S.N.C.F. makes the necessary arrangements for the road side and suggests to the S.N.C.F. what it considers desirable on the railway side;
— organises the working, in particular by assuring the maintenance and supervision of the gearing equipment, the allocation of the wagons, the organisation of the terminal services, the fixing of the rates for haulage;
— deals with everything in connection with the spread and development of the method as well as technical studies and improvements.

S.E.G.I. solution (low loading bogie wagon and Kangaroo wagon).

A. *Rail transport.*

This is carried out at present by rakes which include both low loading wagons and Kangaroo wagons (1) included in the ordinary fast goods trains (G.V.); two services are now being run :

— Paris-Bordeaux;
— Paris-Lyons.

The proposals of the S.N.C.F. in this field are :

a) to limit it to certain main arteries where costs are low, since the road vehicles carried, which in practice are not of any special type, can deal with the considerable road transport at the end of the run; besides Paris-Lyons and Paris-Bordeaux, they intend to operate the following runs :

---

(1) The lorries and trailers are loaded onto low loading wagons. The semi-trailers are loaded onto Kangaroo wagons.

When an articulated vehicle (tractor + semi-trailer) has to be transported, it is uncoupled during the railway run, the tractor being loaded onto a low loading wagon and the semi-trailer onto a Kangaroo wagon.

— Paris-Toulouse;
— Paris-Avignon-Marseille;
— Bordeaux-Toulouse-Marseille

and perhaps :

— Paris-Strasbourg;
— Lyon-Lille;
— Lyon-Strasbourg.

The present timetable is as follows :

Paris (Pompadour) . . .	dept. : 21 h 05	arrv. : 5 h 57 (distance : 574 km)
Bordeaux	arrv. : 5 h 34	dept. : 20 h 35
Paris (Pompadour) . . .	dept. : 20 h 53	arrv. : 7 h 42 (distance : 489 km)
Lyon	arrv. : 5 h 39	dept. : 21 h 44

b) to run these services as soon as the volume of traffic makes it feasible with complete trains of about 25 wagons, which will make it possible, due to suppressing intermediate marshalling operation, to speed up the service and above all to reduce the costs.

B. *Terminal road transport.*

As the vehicles are covered by and accompanied by their long distance coordination licences, no limits are imposed by law on the terminal road transport. This varies considerably according to the business of the undertakings concerned : for example, a firm may carry various goods to Bordeaux and Paris and their suburbs only; another carrying wine from the immediate neighbourhood of Bordeaux serves all the regions lying to the north of Paris (Abbeville some 170 km from Paris; Rouen, 120 km...). The regions served are shown diagrammatically upon the map below :

In every case, the terminal road transport is at the expense of the road undertaking. If the vehicle carried is a lorry or articulated vehicle, the driver can travel with it : for this purpose a coach with « couchettes » is included in the rake of wagons or the train.

Naturally if he prefers, the road haulier can have the vehicle collected at destination by anyone else he may like to appoint.

C. *Rail-road terminal installations.*

The fixed terminal installations (straight sections of line, parking, etc.) are built by the S.N.C.F. at its own expense.

They are placed at the disposal of the S.T.E.M.A. free of charge, the latter assuring the working and being responsible in particular for :

— loading the vehicles on the wagons and unloading them;
— securing the vehicles.

Checking the weight is done in all cases by weighing them before loading.

As regards checking that they come within the loading gauge, this problem does not arise in the case of the heavy semi-trailers loaded onto Kangaroo wagons which having been adapted for this type of transport have been previously checked and marked to show they have been passed.

In the case of the low loading bogie wagons, each vehicle must be checked on the ground before being loaded by means of a special gauge.

At the present time in the Paris, Bordeaux and Lyon depots, the check is made in the following way : the lorries are passed when being weighed under a fixed loading gauge complying with the minima conditions laid down for vehicles loaded onto a wagon.

D. *Commercial organisation.*

The business side is managed by the S.T.E.M.A. which deals with the transport undertakings, collects their vehicles and makes up the rakes or complete trains which are handed over to the S.N.C.F.

The S.T.E.M.A. in addition assures the working and allocation of the railway stock, the maintenance of the latter being at the expense of S.E.G.I.

* * *

On the *Abidjan-Niger Railway.*

A. *Rail transport.*

This concerns only the Abidjan-Dimbokro run (183 km) this being in the centre of the region producing coffee and cocoa.

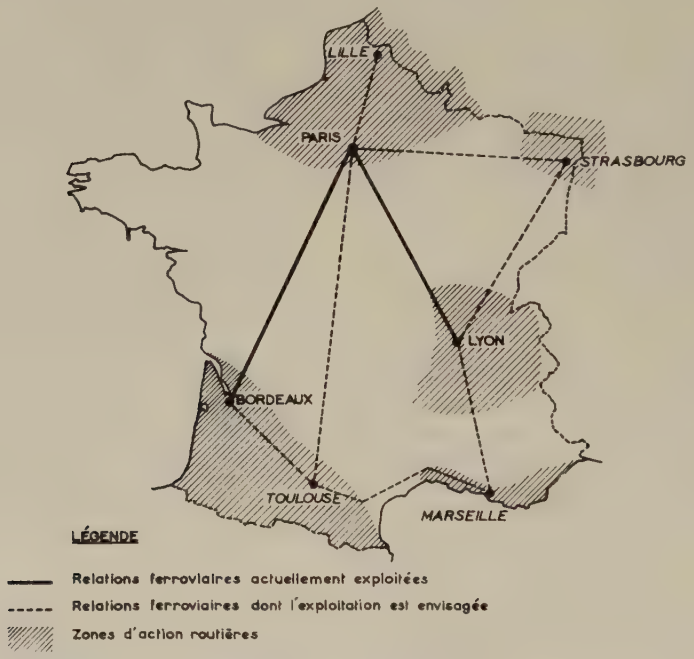
The transport of the semi-trailers takes place on single wagons included in the ordinary slow goods trains.

C. *Terminal rail-road installations.*

The terminal installations have been arranged by the railway.

Loading and unloading the semi-trailers is carried out by the A.T.A. under the supervision and checking of the railway.

No check of the loading gauge is necessary, as the dimensions of the semi-trailers have been adapted to railway transport.



Transport of road vehicles on S.E.G.I. wagons.

B. *Terminal road transport.*

This extends for some miles, sometimes for more than 100 km. It is organised by the A.T.A. which has tractors at each end of the run.

The total journey time for the mixed transport is at least as long as the time it would take to make the journey by road owing to the time lost at the change-over points and the need to wait for the train at the loading station.

As regards the load, the capacity of the wagons used (20 t) considerably exceeds the total weight of the loaded semi-trailers (14.330 t).

* * *

On the *Italian State Railways :*

A. *Rail transport.*

The introduction of the FERAUT system, if the trials are satisfactory, will to begin with be on the line linking up Milan and the Puolie and vice versa.

The service will consist exclusively of complete trains of 24 wagons, in order above all to obtain faster runs and greater profit from the working. The wagons will belong to the MARINI Co.

The drivers of the road vehicles will not be carried.

B. *Terminal road transport.*

The terminal road transport will be carried out by means of vehicles belonging to the MARINI organisation.

The total journey time for door to door transport will be less than that of a journey by road.

C. *Rail-road terminal installations.*

The terminal installations (hoists, etc.) of the FERAUT service will be built at the expense of the MARINI Company.

Likewise all the movements in the stations for transferring the containers from their road chassis to the wagons or vice versa will be carried out by the MARINI Company at its own expense.

The containers needed to assure this combined service will be manufactured so as to respect the limits of both road and railway loading gauges.

The MARINI organisation will be responsible for the control of the maximum weight and road loading gauge whilst the F.S. will supervise the maximum weight and railway loading gauge requirements.

* * *

CHAPTER V.

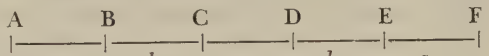
TARIFFS.

I. The tariff build up.

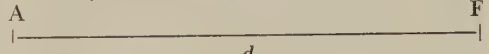
Transport from premises A to premises F in the case of combined rail-road transport is made up of :

a) the terminal road transport AB and EF;
b) the operations in stations BC and DE;
c) the railway transport CD.

Combined transport :



Purely road transport :



The cost of transport to be met by the client is : $a_1 + b_1 + c + b_2 + a_2$.

On the *Austrian Federal Railways,* these various operations take place in the following way :

Operation	*This operation is carried out by*	*Who is paid by*	*The price is fixed by*	*This price is based on :*
	1	2	3	4
a_1	I — Ö.B.B. delivery service	Consignor	Ö.B.B.	Cost + profit
	II — Consignor (*)	—	—	—
b_1	I — Ö.B.B.	Consignor*	Ö.B.B.	Cost + profit
	II — Consignor (*)	—	—	—
c	I — Ö.B.B.	Consignor	Ö.B.B.	Ö.B.B. tariff
	II — Ö.B.B.			
b_2	I — Consignee (*)	—	—	—
	II — Ö.B.B. delivery services	Consignor	Ö.B.B.	Cost + profit
a_2	I — Consignee (*)	—	—	—
	II — Ö.B.B. delivery services	Consignor*	Ö.B.B.	Cost + profit

I — Vienna-Feldkirch run
II — Bludenz-Vienna run

(*) Consignor and consignee are in each case the producers (works) or firms having a depot in Vienna.

On the *French National Railways* the tariff build up differs according to whether it is a question of the U.F.R. technique or the S.E.G.I. techniques.

Operation	*The operation is carried out by :*	*The work is paid to whom does it : (Column 1)*	*The cost of the operation is decided by :*	*The cost of the operation is based on :*
UFR technique	1	2	3	4
a_1	At the choice of the road haulier (1)			—
	a - either himself or by a firm chosen by him	Road haulier(1)	by agreement	
	b - or by the undertaking designated by the G.T.T.M.	Road haulier	by agreement within the framework of a maximum tariff	The maximum tariff laid down by G.T.T.M.
b_1	Undertaking designated by the G.T.T.M.	Road haulier	G.T.T.M.	G.T.T.M. tariff
c	Railway	Road haulier	The railway	Tariff No. 107 and 107 *bis*
b_2	Undertaking designated by the G.T.T.M.	Road haulier	G.T.T.M.	G.T.T.M. tariff
a_2	At the choice of the road haulier			
	a - either himself or by a firm chosen by him	Road haulier	by agreement	—
	b - or by the undertaking designated by the G.T.T.M.	Road haulier	by agreement within the framework of a maximum tariff	Maximum tariff laid down by G.T.T.M.
SEGI techniques				
a_1	Road haulier	Road haulier	Road haulier(2)	
b_1	S.T.E.M.A.	Road haulier	S.T.E.M.A.	S.T.E.M.A. tariff
c	Railway	S.T.E.M.A.	The railway	Tariff 118
b_2	S.T.E.M.A.	Road haulier	S.T.E.M.A.	S.T.E.M.A. tariff
a_2	Road haulier	Road haulier	Public road transport undertaking (2)	

(1) Or the undertaking using the semi-trailer in the case of private transport (on the firm's own behalf).
(2) The public road transport undertaking fixes the price for the transport from A to F, deals with the transport from AB and EF and settles to S.T.E.M.A. the cost of the transport for the run from B to E.

On the *Abidjan-Niger Railway,* the operations take place as follows :

Operation	*The operation is carried out by :*	*The work is paid to whom does it (Column 1)*	*The price of the operation is fixed by :*	*The price of the operation is based on :*
	1	2	3	4
a_1	A.T.A. (1)	The client	A.T.A.	agreement
b_1	A.T.A.	The client	A.T.A.	agreement
c	The Railway	A.T.A.	The Railway	Tariff No. 35
b_2	A.T.A.	The client	A.T.A.	agreement
a_2	A.T.A.	The client	A.T.A.	agreement

(1) A.T.A. = Société Africaine de Transports Auxiliaires.

II. Tariffs in force for the railway part of the mixed transport.

For the combined traffic on the above two lines, the *Austrian Federal Railways* have got out a special tariff, *Tariff 79.* This lays down the transport price for goods of all kinds loaded into road vehicles without motor as :

— 2 500 groschen per 100 kg (for 15 t lots) for the Vienna-Feldkirch run;
— 2 500 groschen per 100 kg (for 10 t lots) and 2 260 groschen per 100 kg (15 t lots) for the Bludenz-Vienna run.

The transport charge is based on the gross weight of the loaded vehicle without making any distinction between the weight of the goods and the weight of the vehicle. The statement on the transport documents must state : « Goods of all kinds loaded onto road vehicles without motors ».

The rates of special tariff 79 correspond more or less to the D class tariff, and are therefore lower than those of the tariffs for grouped consignments, but still higher than the road rates. The receipts obtained cover the costs and make a profit, though a very small one it is true, in spite of the long distances concerned. As the special tariff is at the same time a weapon against road competition, the rates in question are the maximum that can be charged without risking the transfer of the traffic to the road.

Not only is special tariff 79 advantageous for the Ö.B.B., owing to the receipts it brings it, but it also enables the consignors to save on the cost of consigning and packing.

According to custom, when the transport distance calculated by the Railway exceeds 65 km, the benefit of reduced rates or any other tariff concession is only granted to those clients who have previously agreed that they will send by rail the whole of their goods, or all those of a certain category; the benefit of tariff 79 is only granted under this condition.

There is only one consignor on each of the two runs in question.

* * *

The *French National Railways* have introduced a special tariff for the transport of road vehicles on wagons; this tariff differs according to whether it is question :

— of the U.F.R. solution, to which tariffs Nos. 107 and 107*bis* apply;
— of the S.E.G.I. solutions, to which tariff No. 118 applies.

*Tariffs Nos. 107 and 107*bis (U.F.R. technique).

Tariff No. 107 applies when the semi-trailers have a useful load equal to 10 t or less, and tariff No. 107*bis* when it is above 10 t.

Transport of loaded semi-trailers.

In every case, the semi-trailers must be previously passed by the S.N.C.F. if they are to benefit by these tariffs, which include three scales :

1. *General scale.*

Applicable to all semi-trailers whose owners have contracted only to use them on the road to complete the railway transport, previously agreed by the Railway.

The transport rate is based on the weight of the goods carried, excluding the dead weight of the vehicle, according to the tariffs per wagon applicable to such goods.

On the other hand, the semi-trailer enables the S.N.C.F. to make use of a flat wagon and thus save on the body of a covered wagon, so that an allowance is made to the owner of the vehicle; this is calculated as a percentage of the transport rate as a function of the distance.

2. *Special scale.*

Applied to firms recognised by the S.N.C.F. as having entered into a co-ordinated programme of operating with them.

Such programmes may for example lay down the kind and tonnage of the goods to be carried and the services to be used by this traffic.

The transport rate, which is *independent of the kind of goods,* consists of two parts :

— a rate based on the weight of the goods carried, according to a special scale;
— a surcharge for each semi-trailer, the amount of which depends upon the distance.

The amount of the transport rate obtained by adding together these two factors has been based on the railway's costs; it is lower than the general transport rate defined above; the difference which varies according to the case in question, is on the average 30 %.

In practice, all the U.F.R. semi-trailers, which are covered by one of the agreements described in Chapter III, run according to an agreed programme and enjoy this tariff.

3. *Liberal scale.*

Coming under tariff No. 107*bis,* this only applies to semi-trailers with a useful load of more than 10 t provided that the firm using them :

— has drawn up an agreed programme with the S.N.C.F. and has undertaken to make a minimum number of journeys per annum;
— sends with them on the journey the same co-ordination permits as if they had gone by road.

The transport rate, independent of the type of goods, includes :

— a rate based on the weight of the goods carried;
— a surcharge for the semi-trailer;
— both together being 33 % higher than the regime described under § 2 above.

At the end of the year, the road undertaking is granted a reduction in the form of an allowance, the amount of which is proportional to the number and importance of the rail journeys made. This reduction means that the actual transport rate paid by each semi-trailer is the same as that which would be paid under the special scale described in § 2 above, when the annual mileage travelled on the railway is equal to the average annual mileage (i.e. 60 000 km approximately) travelled by the semi-trailers enjoying the special rates.

Transport of empty semi-trailers.

These are carried according to a reduced scale of charges.

Special arrangements made for firms belonging to the G.T.T.M.

When the owners of the semi-trailers belong to a professional association agreed by the S.N.C.F., in practice the G.T.T.M., such an association enjoys an allowance equal to 6 % of the total transport rate for the first 750 000 tons which members of the group send by rail and 4 % for

the tonnage over and above 750 000 tons. This allowance enables the G.T.T.M. to organise the working of the terminal rail-road installations and to maintain the wagon equipment (wedges, tackles, etc.).

Method of protecting certain railway traffics.

This method is the result of the obligation imposed upon the firms if they wish to benefit by the special rates laid down in § 2 above, to make a preliminary agreement with the S.N.C.F. and draw up an agreed programme together.

In addition, the conditions under which this special tariff is granted stipulate that consignments consisting partly or wholly of grouped goods are excluded from the above benefits.

This exclusion is justified by the fact that such grouped goods could only be charged at the rate and under the conditions of a special tariff (tariff No. 100) which applies solely to undertakings having an agreement with the Railway.

International traffic.

There are no similar tariffs in the case of international traffic.

Mention may, however be made of a Franco-Italian tariff for the transport of U.F.R. rail-road trailers which is now being established and is intended to come into force in November 1959. This tariff will repeat the essential provisions of tariffs Nos. 107 and 107*bis*.

A Franco-German tariff is also being negotiated; this should come into force in a few months time.

Tariff No. 118 (S.E.G.I. techniques).

This tariff is at the present time limited to public transport vehicles. The conditions under which it can also be extended to private transport (transport on the owner's behalf) is under study.

In order to qualify for tariff No. 118, through the S.T.E.M.A., the owners of the road vehicles used for public transport are not required to enter into any agreement with the railway, but their vehicles must be covered and accompanied during the railway run by a certificate showing that they are included in a Register of public transport firms, Section I, Long distance, for a tonnage equal to their nominal useful load, just as if they were running on the road.

The transport rate, independent of the kind of goods, is obtained by adding the two factors :

1) the tonnage rate based on the cumulative weight of the vehicle and goods loaded therein, with a minimum which varies according to the type of vehicle;
2) a surcharge per vehicle.

Allowances and a premium for regular consignments are granted to the S.T.E.M.A. for rakes of road vehicles.

The rate has been fixed as a function of the cost of road transport; it corresponds to the sum which the road firm can spend on railway transport yet the overall cost of the door to door transport will remain about the same, whether it is made entirely by road or by the combined method.

Here are some examples of railway rates paid by the S.T.E.M.A. to the S.N.C.F. for transport in rakes on the Paris-Lyon run (489 km) (rate per road vehicle) :

Kind of vehicle	*Tare* t	*Useful load* t	*Total weight loaded* t	*Weight charged for* t	*Rate for tariff No. 118* (1) N.F.
10 t lorry loaded	9	10	19	19	315.90
15 t lorry loaded	11	15	26	26	400.20
20 t semi-trailer loaded	6	20	26	26	421.39
15 t lorry empty	11	—	11	15	359.43
20 t semi-trailer empty	6	—	6	14	340.61
20 t semi-trailer empty carried not more than 48 h after being carried loaded	6	—	6	8	218.90

(1) These rates in new French francs (N.F.) include the allowances and regularity premiums.

The distinction between loaded and empty vehicles depends solely on the figure at which the minimum chargeable weight is fixed, the scale being the same, so that :

1) empty road vehicles are only carried when covered and accompanied by their co-ordination certificates; they are then charged under the same conditions as loaded road vehicles;

2) the minimum rate is based on a lower weight when the previous or subsequent journey within a given period has been charged on the minimum weight normally required. This reduced minimum weight is in general greater than the dead weight of the vehicles; it is only equal to it in the case of certain special vehicles (tankers, insulated vehicles, refrigerated vehicles) the very nature of which means that they must be returned empty.

The drivers of the lorries or tractors are carried free of charge, one driver per vehicle.

In addition, the association recognised by the S.N.C.F., in this case the S.T.E.M.A. which is responsible for the weighing, loading, securing and unloading of the road vehicles, enjoys a reduction of 4 %, an allowance which varies according to the tonnage of the complete train, and a regularity premium.

No ways of protecting certain railway traffics have been provided for, the principle of this method of operating being :

— to encourage the road firms to make use of the railway over the greatest possible part of the journey, without however dispensing them from sending with their vehicles the same documents that they would have to carry if going by road, so that consequently their transport potential is not increased;

— to offer them such rates that the cost of the transport from one end to the other will be about the same, whatever way it goes.

The question is obviously different in the case of private transport, and the S.N.C.F. will have to introduce measures to protect itself in this case.

There is no tariff similar to tariff No. 118 for international traffic, the introduction of the S.E.G.I. technique being as yet too recent.

* * *

On the *Mali Railways,* the transport of road vehicles on wagons is rated according to the conditions of the special P.V. (Slow goods) tariff No. 3.

The rate is based on the total gross weight of the vehicles carried on one and the same wagon, whether empty or loaded. The rates are as follows :

Gross weight of the vehicle (or first vehicle in the case of vehicles grouped together on a wagon)	*Price per ton and per kilometre*
Less than 5 t (with a minimum tonnage of 1.5 t)	12 C.F.A. francs
From 5 to 8 t	11 C.F.A. francs
8 t and over	10 C.F.A. francs

If several vehicles are grouped together on a single wagon, the vehicles over and above the first are charged according to the sum of their gross weight, at the rate applying to the above tonnage conditions which corresponds to this weight plus the gross weight of the first vehicle.

Only dangerous materials and goods being the subject of a declaration of value are not accepted for transport.

The wagons carrying road vehicles must have someone accompanying them; he is given a free third class ticket if the weight of the goods loaded is at least equal to half the useful load capacity of the vehicles.

* * *

The *Abidjan-Niger Railway* has introduced for the transport of semi-trailers a special tariff No. 35 with the following main clauses :

1) the tariff only applies to semi-trailers having a useful load capacity of at least 5 t, passed by the Railway, the owner of which agrees only to use them on runs complementary to the railway and previously agreed with the railway;
2) the transport rate to be charged is based upon the weight of the goods carried according to the general or special tariffs applicable per consignment or per wagon, the minimum rate not to be lower than for half the useful load of the semi-trailer. However :
   a) the minimum weight laid down for the application of tariffs per wagon load is reduced by 20 %;
   b) an allowance of one C.F.A. franc is made per semi-trailer per kilometre of the railway journey;
3) an attendant is carried free of charge with each open semi-trailer, whether or not covered by a tarpaulin;
4) the rate for empty runs is the very advantageous one of 3.5 C.F.A. fr. per ton of the tare of the semi-trailer and per kilometre.

No special protection for the traffic has been arranged.

* * *

In the case of the *Swiss Federal Railways,* clause 22 of the general tariff regulations governing Swiss transport undertakings prescribes « that for the road vehicles loaded, the transport rate is calculated according to the cumulative weight of the vehicles and its load. If the goods come under a different tariff class than that applicable to the vehicle, the transport rate is calculated :

— if the weights are not given separately in the transport documents : as though the consignment consisted entirely of the goods paying the highest rate;
— if the weights are indicated separately in the transport documents; per class of tariff, according to the tariff which applies to each of them ».

Transport of this kind is very limited. They may even be considered as occasional, with the exception of the traffic through the St. Gothard, Loetschberg and Simplon tunnels, which are rated on the following bases :

	Rate(1) *per 100 kg gross weight for a minimum of :*		
	1 000 kg	*5 000 kg*	*10 000 kg*
	fr.	fr.	fr.
GOTHARD			
Göschenen — Airolo	2.50	1.20	1.05
— Faido	4.50	2.20	1.95
Erstfeld — Airodo	5.—	2.50	2.20
SIMPLON			
Brig — Domodossola	5.—	2.50	2.20
LOETSCHBERG			
Kandersteg — Goppenstein	4.—	2.—	1.75
— Brig	8. —	4.—	3.50
— Domodossola	13.—	6.50	5.70

(1) Rate in Swiss francs.

The conditions under which road vehicles are accepted are the same whether it is question of transport on behalf of a third party or for the owner himself.

The road firms do not have to sign any contract with the Railway.

No special conditions are laid down about empty vehicles on the return run.

Except in the case of the tunnels through the Alps where there is a special tariff for passengers travelling with their vehicles, the drivers pay the ordinary 1st or 2nd class fares.

* * *

CHAPTER VI.

CONCLUSIONS.

On the *Austrian Federal Railways,* the tonnage of goods carried on the Bludenz-Vienna run and back has been returned to the railway thanks to the inauguration of combined traffic. Up till then, this traffic went by road and was assured by private firms.

The introduction of combined traffic by the railway was to begin with favourably received by all the consignors and by the professional road hauliers. Their interest has however fallen off for the reasons reported in the first Chapter.

* * *

In the case of the results obtained by the *French National Railways* we must make a distinction as before between the U.F.R. and S.E.G.I. techniques.

*U.F.R. technique (Tariffs Nos. 107 and 107*bis).

This technique, whose introduction as a commercial proposition goes back to 1941, has extended very greatly and very quickly as the graph hereafter shows :

This development, in spite of a slight slowing down in 1958 (concerning to a great extent the transport of tankers, affected like the other methods of transport by the falling off in the consumption of wine) is continuing satisfactorily.

On the operating plane, the results obtained are as follows :

I. Working.

a) Tonnage of goods carried in 1957 . . . . . 778 000 t
Tonnage of goods carried in 1958 . . . . . 750 000 t
Number of t/km in 1957 392 000 000 t
Number of t/km in 1958 376 000 000 t
90 % of these t/km are run on lines with heavy traffic, and 50 % on the electrified system;

b) Average distance of the railway run for *loaded* vehicles :
500 km per run in the case of van semi-trailers;
570 km per run in the case of tanker semi-trailers;

c) Average distance covered in the terminal road runs : varies according to the localities served; in practice does not exceed 50 km;

d) Number of runs made with semi-trailers loaded onto wagons in 1958 :

203 952 of which :
118 010 were loaded, i.e. 57.9 %;
85 942 were empty, i.e. 42.1 %.

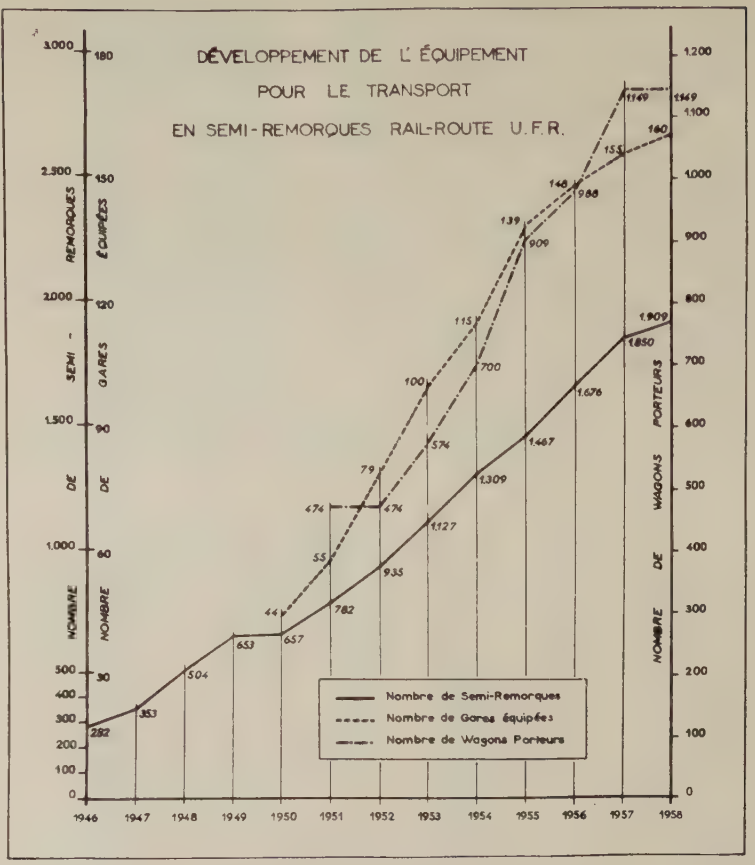
It should be noted :

— that special types of vehicles (tankers, insulated vehicles, etc.) involve by their nature being returned empty over the same route as they were sent loaded;

— that ordinary vehicles (vans) make relatively few empty runs, both as regards the number (on the average one run empty for two runs loaded) and the distance (50 % of the empty runs are over distances of less than 300 km whilst the average run loaded is 500 km;

e) Profitability : the total receipts received by the S.N.C.F. exceed their expenses (fixed installations, motive power, various expenditure).

Moreover, a study of the matter showed that the cost for the community of combined door to door transport was :

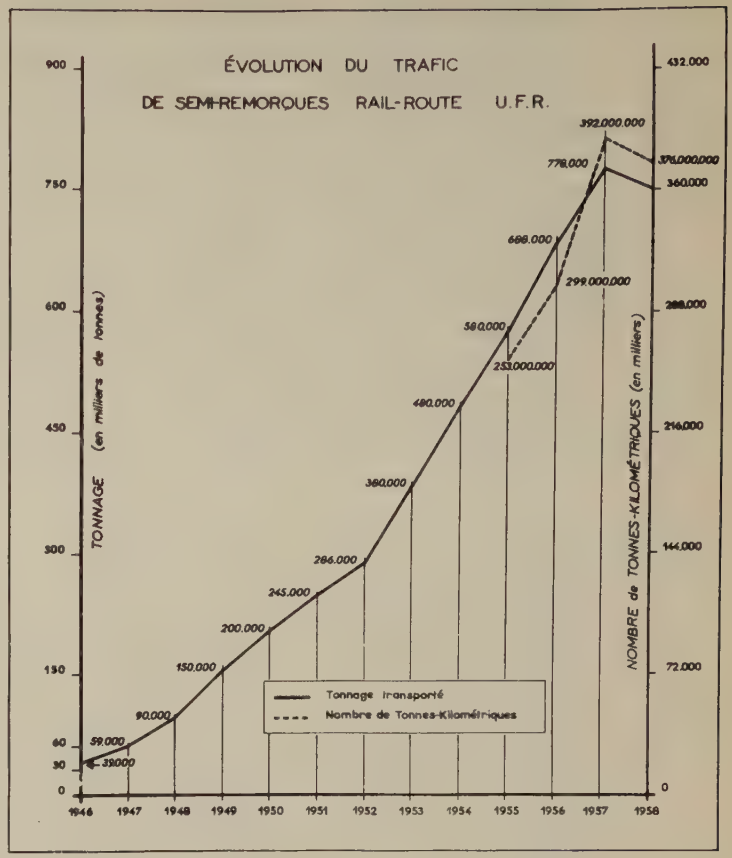


Development of the equipment for the transport of UFR rail-road semi-trailers.

———— Number of semi-trailers.

- - - - - - Number of stations equipped to handle this traffic.

— - — - — Number of wagons for carrying them.



Evolution of the U.F.R. rail-road semi-trailer traffic.

N. B. — Nombre de tonnes-kilométriques... = number of t/km (in thousands). — Tonnage... = tonnage (in thousands of tons).

———— tonnage carried.

- - - - - - Number of t/km.

— less than the cost of the same transport when carried out by road all the way when the distance exceeds 350 km;
— but more when the distance is less than 200 km.

II. Equipment.

a) Number of stations equipped for rail-road traffic : 160;

b) Number of carrying wagons as at the 31st December 1958 :

1 149 of which :
— 201 single carriers (i.e. wagons which can only carry one 7.5 t or 10 t semi-trailer);
— 948 double carriers (i.e. wagons which can take two 7.5 t semi-trailers or one 20 t semi-trailer);

c) Number of semi-trailers in service at the 31st December 1958 :

1 909 of which :
— 933 non specialised semi-trailers (vans, open trucks, etc.) (780 having 7.5 t useful load;
144 having 10 t useful load;
9 having 20 t useful load);
— 445 insulated and refrigerated semi-trailers;
— 531 tankers of all types.

Seventy-five of these vehicles (15 van semi-trailers of 7.5 t capacity and 60 tankers) belong to private firms.

The reception given to this method of transport has been favourable, both as regards the professional road hauliers and the Public Authorities.

On the internal plane, a publicity campaign aimed at the road hauliers is still in full swing (100 trailers were sold during the first quarter of 1959). This extension of the stock of semi-trailers means a parallel increase in the stock of wagons. The number of new stations which have to be opened to this traffic is falling off, which proves that the present system is not far from being able to serve the whole country.

On the international plane, a special effort has been made for some years to develop rail-road traffic in semi-trailers.

To the traffic between France and Belgium and France and the Sarre which has been in existence for some time, traffic between France and Italy was added in 1958. Very shortly, there will be exchanges of traffic between France on the one hand and Germany and Switzerland on the other. Finally, a project is now being studied for traffic between France and England, making use of the ferry-boat services.

S.E.G.I. technique.

It is still too soon to give any valid results, in view of the recent date of introduction of this method.

As regards equipment, on the 1st October 1959, the S.T.E.M.A. had the following stock :

— traffic using S.E.G.I. low loading wagons :
— 50 low loading wagons, 12 of which for ends;
— 6 mobile ramps;
— traffic using Kangaroo wagons :
— 46 Kangaroo wagons;
— 6 ramps (2 fixed ramps at Bordeaux and Lyon);
— 6 shunting tractors.

Three terminal installations have been set up, at Maisons-Alfort Pompadour (10 km from Paris) at Bordeaux, and at Lyon, making it possible as a first stage to operate services between Paris and Lyon and Paris and Bordeaux. The opening of an installation at Toulouse for the Paris-Toulouse service is projected for 1960.

The S.E.G.I. technique has aroused great interest amongst the professional road hauliers, a certain number of which are beginning to make use of the S.T.E.M.A. services.

In view of the costs on the runs in question, the receipts are higher than the cost to the S.N.C.F. As far as the future is concerned, the S.N.C.F. intends to develop this method of transport and extend it to other important lines : Paris-Avignon-Marseille, Paris-Toulouse, Paris-Strasbourg, Bordeaux-Marseille, Lyon-Lille, Lyon-Strasbourg.

Comparing the techniques.

In this way, the S.N.C.F. has put into operation two distinct services having the same object in view : to carry road vehicles on wagons. The commercial and tariff arrangements made for each of them is intended to allow them to develop in parallel and complement each other.

With the U.F.R. technique as with the S.E.G.I. technique :

— the road transport undertaking retains its professional entity and deals directly with its clients, which the S.N.C.F. does not know;

— the S.N.C.F. merely assumes the role of transporter for the rail part of the journey.

With the U.F.R. technique, the first introduced :

a) the whole country is served by the railway system, the terminal road transport being limited to short distances;

b) the road haulier has in fact definitely opted for combined rail-road transport by handing over his co-ordination rights for 10 or 15 years;

c) in return for the undertaking he has given the S.N.C.F. (handing over his co-ordination rights, agreed programme, promise to limit his road transport to transport complementary to the railway), the latter enjoys certain financial advantages (help in buying the semi-trailers), as well as fiscal (exemption from the surcharges) and tariff advantages;

d) the railway transport contract is made between the S.N.C.F. and the road haulier.

With the S.E.G.I. techniques :

a) it is question of bulk transport by complete trains on a few important routes; the terminal road transport is over long distances;

b) the road haulier is free at any moment to decide whether he will send his traffic by road or by rail and road combined; in the latter case, the only obligation imposed on him is to send the same documents with his vehicles as though it had gone by road;

c) the road haulier deals directly with the S.T.E.M.A. alone;

d) the railway transport contract is made between the S.N.C.F. and S.T.E.M.A.

* * *

The results of the working organised by the *Abidjan-Niger Railway* are shown below :

Average distance of the railway transport per journey made	183 km (*Abidjan-Dimbokro*)
Average distance of the terminal transport by road	1 to 8 km at *Abidjan* on the average; 60 km at *Dimbokro*
Annual tonnage of goods carried	2 286 t in 1956
Number of wagons used for this purpose	6
Number of wagon/km :	
loaded	43 860 km
empty	7 380 km
Number of stations equipped for the combined services and material used	2 (*Abidjan and Dimbokro*)
Number of road vehicles used	5 tractors and 8 trailers
Average number of vehicle runs per annum :	
loaded	240
empty	40

Kind of traffic carried ° full loads, grouped consignments

Main kind of goods carried : coffee, cocoa, divers salt, cement, drink, groceries.

Services.

from	*to*	*distance*	*No. of journeys per month*	*Duration of rail journey*	*Turn-round time of road vehicle*	*Tonnage carried per month on the average*	*Kind of goods carried*
Abidjan	*Bocanda*	236				326 t	See above
	M'Bahiakro	298				—	
	Kotobi	250		6 h			
	Bongouanou	240	20	during	1 to 3	season	
	Toumodi	223	(7 months)	the	days	only	
	Bouafle	327		nightime		lasts	
	Sinfra	347				7 months	
	Oume	282					
	Daloa	405					
	Yamoussoukro	269					

This method of transport was received :

— very badly by the recognised agents and professional hauliers;

— with great reserve by the private firms who had no confidence in the results of the formula;

— with indifference by the Public Authorities, although they facilitated the setting up of the A.T.A.

By reason, on the one hand, of the difficulties encountered which led to the service being given up, and, on the other hand, to the success of the appointed collecting agents, the Abidjan-Niger Railway has no projects in hand as regards the transport of road vehicles on wagons.

* * *

In spite of their small number, the replies received from the French speaking railway Administrations, who have studied the question of carrying road vehicles on wagons, show the interest this new formula for combined rail-road transport has for the railway.

In fact, apart from the S.N.C.F. which has a rather more extensive experience in this field, the finding of solutions is still in the investigation or trial period. This can largely be explained by the importance and complexity of the factors involved in these investigations.

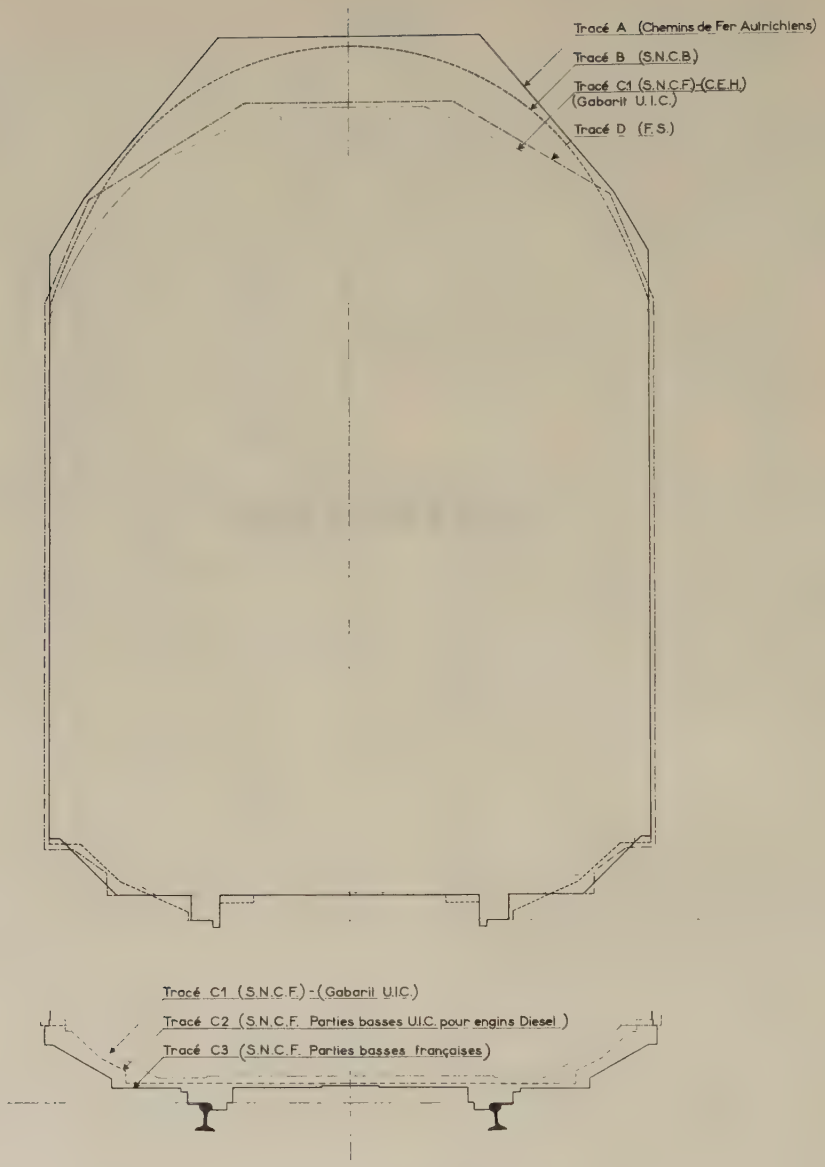
But the actual diversity of the solutions put forward brings out the risk there is that in the end each country will adopt some different technique. Such a development whilst prejudicing the development of international traffic, is bound to be harmful to the Railways themselves.

On the contrary, at a time when economic and social evolution is tending to encourage the Nations to increase their commerce with each other, it is to the interest of the Railway Administrations to include amongst the transport facilities they offer their clients formulae for combined rail-road traffic which can be used beyond the frontiers of each individual country.

Such a result can only be obtained by measures of standardisation. The stage reached by the various countries in their studies and trials of carrying road vehicles on wagons makes this feasible.

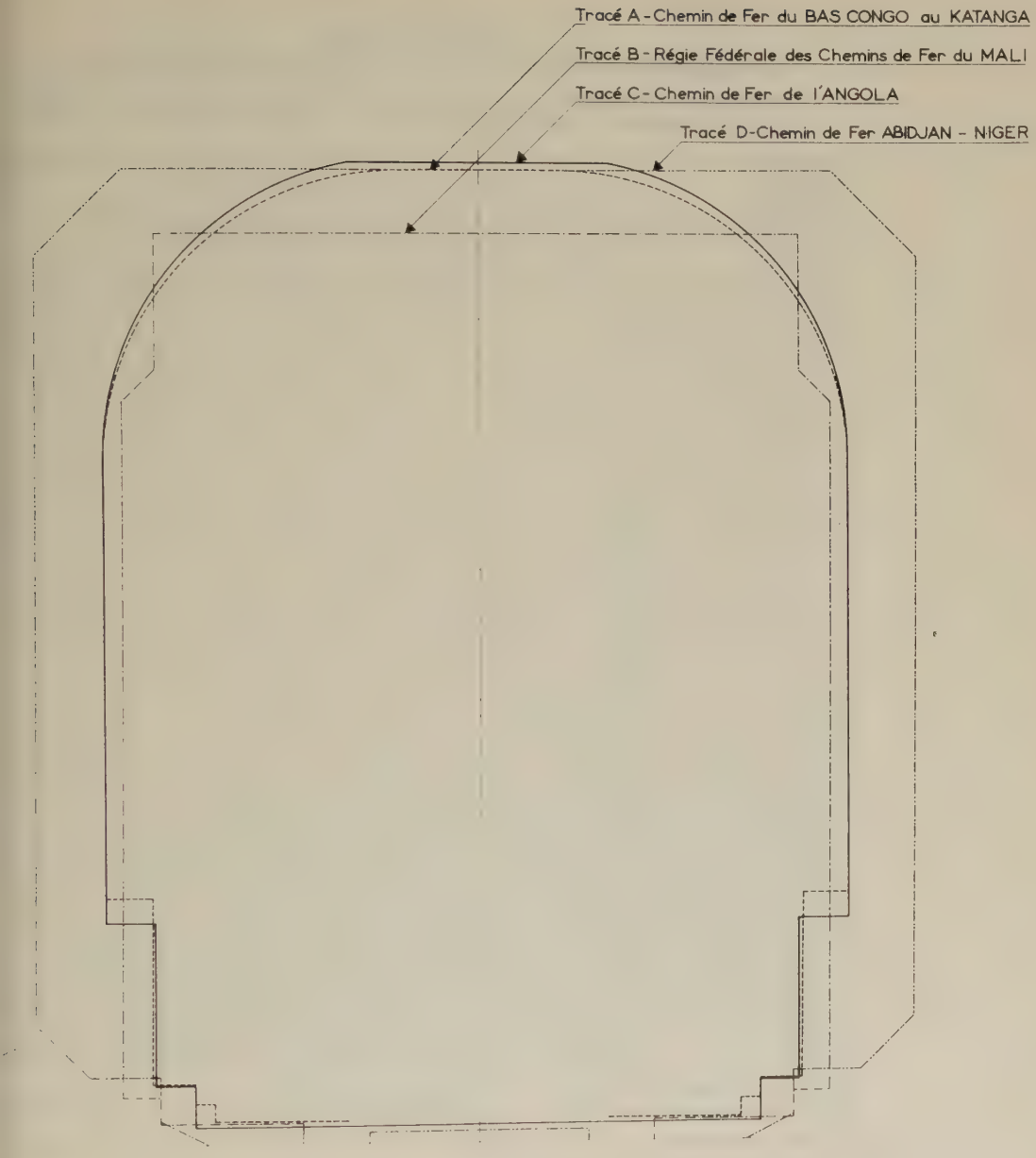
Therefore it appears desirable to continue these studies and to combine the efforts being made wihin the framework of technical and commercial collaboration between the different railway Administrations in order to arrive at as small a number as possible of solutions which could be used in the greatest number of countries.

APPENDIXES


Tracé A (Chemins de Fer Autrichiens)
Tracé B (S.N.C.B.)
Tracé C1 (S.N.C.F)-(C.E.H.)
(Gabarit U.I.C.)
Tracé D (F.S.)
Tracé C1 (S.N.C.F.)-(Gabarit U.I.C.)
Tracé C2 (S.N.C.F. Parties basses U.I.C. pour engins Diesel)
Tracé C3 (S.N.C.F. Parties basses françaises)

Explanation of French wording :

Tracé A (Chemins de fer Autrichiens) = outline A (Austrian Railways). — Tracé B (S.N.C.B.) = outline B (S.N.C.B.). — Tracé C1 (S.N.C.F.) - (C.E.H.) (gabarit U.I.C.) = outline C1 (S.N.C.F.) - (C.E.H.) (U.I.C. gauge). — Tracé D (F.S.) = outline D (F.S.). — Tracé C1 (S.N.C.F.) (gabarit U.I.C.) = outline C1 (S.N.C.F.) (U.I.C. gauge). — Tracé C2 (S.N.C.F., parties basses U.I.C. pour engins Diesel) = outline C2 (S.N.C.F., U.I.C. low parts for Diesel engines). — Tracé C3 (S.N.C.F., parties basses françaises) = outline C3 (S.N.C.F., French low parts).


Tracé A - Chemin de Fer du BAS CONGO au KATANGA
Tracé B - Régie Fédérale des Chemins de Fer du MALI
Tracé C - Chemin de Fer de l'ANGOLA
Tracé D - Chemin de Fer ABIDJAN - NIGER

Explanation of French wording :

Tracé A (Chemins de fer du Bas-Congo au Katanga) = outline A (lower Congo to Katanga Railway). — Tracé B (Régie Fédérale des Chemins de fer du Mali) = outline B (Mali Federal Railways). — Tracé C (Chemin de fer de l'Angola) = outline C (Angola Railway). — Tracé D (Chemin de fer Abidjan-Niger) = outline D (Abidjan-Niger Railway).

Loading Table I
for those parts of loads which lie between the outer axles or the bogie centres.

Reduction in the width of the loads on each side, in centimetre, i.e. smaller spaces to be left horizontally between the loads and the loading gauge.

Distance en mètres entre les essieux extrêmes ou entre les pivots	Pour une distance, en mètres, de la section considérée à l'essieu extrême le plus rapproché (wagons à deux ou plusieurs essieux) ou au pivot le plus voisin (wagons à bogies ou paires de pivots)																			
	0,5	1	1,5	2	2,5	3	3,5	4	4,5	5	5,5	6	6,5	7	8	9	10	11	12	13	14
2,5	0	0	0	0																	
3	0	0	0	0																	
3,5	0	0	0	0	0	0															
4	0	0	0	0	0	0															
4,5	0	0	0	0	0	0															
5	0	0	0	0	0	0															
5,5	0	0	0	0	0	0															
6	0	0	0	0	0	0															
6,5	0	0	0	0	0	0	0														
7	0	0	0	0	0	0	0														
7,5	0	0	0	0	0	0	0	0													
8	0	0	0	0	0	1	1	1													
9	0	0	0	0	1	1	1	2	2												
10	0	0	0	1	1	2	2	2	2	3											
11	0	0	1	1	2	2	3	3	3	4	4										
12	0	0	1	2	2	3	3	4	4	5	5	5									
13	0	0	1	2	3	3	4	5	5	6	6	6	6								
14	0	0	1	2	3	4	5	6	6	7	7	7	7	8							
15	0	0	1	3	4	5	6	6	7	8	8	8	9	9	9						
16	0	1	2	3	4	5	6	7	8	9	9	10	10	10	10						
17	0	1	2	4	5	6	7	8	9	10	10	11	11	12	12	13					
18	0	1	2	4	5	7	8	9	10	11	11	12	13	13	14	15					
19	0	1	3	4	6	7	8	10	11	12	12	13	14	15	17	17	18				
20	0	1	3	5	6	8	9	11	12	13	14	16	17	17	19	20	20				
22	0	2	4	6	7	9	11	12	14	16	17	19	21	22	24	26	27	27			
24	0	2	4	6	8	10	12	14	16	19	21	23	25	27	30	32	34	35	35		
26	0	3	5	7	9	11	13	16	19	22	24	27	30	32	35	38	40	42	43	43	
28	0	3	5	8	10	13	16	19	22	26	28	31	34	36	41	44	47	50	51	52	52
30	0	3	6	9	11	14	18	22	25	29	32	35	38	40	46	50	53	56	59	61	62

Pour les dimensions qui ne sont pas données dans le tableau, on utilisera toujours les valeurs supérieur les plus rapprochées.

Explan

Distance, en mètres, entre les essieux extrêmes ou entre les pivots = distance, in metres, betwee a distance, in metres, from the section in question. — A l'essieu extrême le plus rapproché (nearest outer axle (wagons with two or more axles) or from the nearest bogie centre (wagons toujours les valeurs supérieures les plus rapprochées = for the dimensions not given in the a

APPENDIX II — 3.

Loading Table II

for those parts of the loads which lie beyond the outer axles or the bogie centres.

Reduction in the width of the loads on each side, in centimetre, i.e. smaller spaces to be left horizontally between the loads and the loading gauge.

nce tres les ux nes tre vots	Pour une distance, en mètres, de la section considérée																				
	à l'essieu extrême le plus rapproché (wagons à deux ou plusieurs essieux) ou au pivot le plus voisin (wagons à bogies ou paires de pivots)																				
	0,5	1	1,5	2	2,5	3	3,5	4	4,5	5	5,5	6	6,5	7	8	9	10	11	12	13	14	15
,5	0	1	3	5																		
	0	1	3	5																		
,5	0	1	2	4	6	8																
	0	0	2	4	6	8																
,5	0	0	2	3	5	7																
	0	0	2	3	5	7																
,5	0	0	1	3	5	7																
	0	0	1	3	5	7	9	11	13	15	18	20	23	25	31	39	49					
,5	0	0	1	3	5	7	9	11	13	15	18	20	23	25	31	39	49					
	0	0	1	3	5	7	9	11	13	16	18	20	23	26	31	40	50					
,5	0	0	1	3	5	7	9	11	13	16	18	20	23	26	32	41	51					
	0	0	1	3	5	7	9	11	13	16	18	20	23	26	32	42	52					
	0	0	1	3	5	7	9	11	14	16	18	21	24	26	34	44	54					
	0	0	2	3	5	7	9	12	14	17	19	22	24	27	36	46	56					
	0	0	2	4	5	8	10	12	14	17	19	22	25	29	38	48	59					
	0	0	2	4	6	8	10	13	15	17	20	23	26	30	40	51	62					
	0	0	2	4	6	8	11	13	16	18	21	24	27	33	42	53	64					
	0	0	2	4	7	9	11	14	16	19	22	25	29	34	45	56	67					
	0	1	3	5	7	9	12	14	17	20	23	26	31	36	47	58	70					
	0	1	3	5	7	10	12	15	18	21	24	28	33	38	49	61	73					
	0	1	3	5	8	10	13	16	18	21	25	30	35	41	52	63	76					
	0	1	3	6	8	11	13	16	19	22	26	32	37	43	54	66	79					
	0	1	4	6	9	11	14	17	20	23	28	33	39	45	57	69	82					
	0	1	4	6	9	12	15	18	21	24	30	35	41	47	59	72	85					
	0	2	4	7	10	13	16	19	22	28	33	39	45	51	64	77	92					
	0	2	5	8	11	14	17	21	25	31	37	43	49	56	69	83	98					
	0	2	5	9	12	15	19	22	28	34	40	47	53	60	74	88	104					
	0	3	6	9	13	16	20	25	31	37	44	50	57	64	80	94	111					
	0	3	7	10	14	17	21	27	34	40	47	54	61	69	85	100	117					

r les dimensions qui ne sont pas données dans le tableau, on utilisera toujours les valeurs supérieures les plus rapprochées.

ding :

or between the bogie centres. — Pour une distance, en mètres, de la section considérée = for plusieurs essieux) ou au pivot le plus voisin (wagons à bogies ou paires de pivots) = from the irs of centres). — Pour les dimensions qui ne sont pas données dans le tableau, on utilisera closest higher values will be used.

	Austria	*Belgium*	*France*	*Greece*
				Pr
Overall length	2.40 m for motor vehicles, 2.35 m for trailers — not used for passenger transport	2.50 m	2.50 m	2.50 m
Overall height	3.80 m	4 m	nil	3.80 m
Overall length :				
— *4 wheeled lorry*	10 m	12 m	11 m	10 m
— *6 wheeled lorry*	11 m	12 m	11m	11 m
— *articulated vehicle (tractor + semi-trailer)*	14 m	14 m	14 m	—
— *semi-trailer on its own*	nil	11 m	nil	—
— *together :*				
lorry + 1 trailer	18 m	22 m	18 m	18 m
lorry + 2 trailers	22 m	not alllowed		not allowed
Maximum authorised axle weight:				
— *for a single axle*	8 t	13 t	13 t	6 t for one pneumatic tyr 8 t for two pneumatic tyr
— *for a double axle (per axle as a function of the distance between the 2 axles)*	8 t if distance between axles is 1 m 13 t if distance between axles is between 1 and 2 m	10 t in the case of the most heavily loaded axle	from 14.7 to 21 t (1)	14.5 t for a distance of a least 1 m
Maximum authorised weight per vehicle :				
— *4 wheeled lorry*	13 t	19 t (3)	19 t (2)	8 t with single rear pneum. t 10.7 t w. double rear pn. t
— *6 wheeled lorry*	18 t	26 t	26 t	19.3 t if distance between o axle is at least 6 m
— *articulated vehicle*	20 t (3 axles) 25 t (4 axles) 30 t (5 axles)	32 t	35 t	15 t semi-trailer alone
— *together :*				
lorry + 1 trailer	33 t	32 t	35 t	—
lorry + 2 trailers	33 t	not allowed		—
Minimum mudguards	—	nil	nil	—
Type of coupling between tractor and semi-trailer	—	—	90% B.N.A. 10 % SCAMEL and U.F.R.	—

(1) The maximum weight authorised for a double axle is 7.350 t + A/20 − 0.356 with maximum of 21 t, A being the dis in metres between the centre lines of the two axles.

(2) For all vehicles, the total weight authorised must not exceed 5 t per linear metre of distance between the two outer

(3) For all vehicles or sets of vehicles, the maximum weight authorised must not exceed (13 + 2.25 A) tonnes, A bein distance in metres between the centres of the outer axles.

(4) When the vehicle is fitted with pneumatic tyres of a type with which the average pressure on the area in contact c road is not more than 8 kg per cm² and when in the case of 3 axled vehicles, the distance between two adjoining

Italy	*Switzerland*	*Mali Federation*	*Abidjan-Niger Ry*	*1949 International Convention*
n				
2.50 m	2.30 m	2.50 m	2.50 m	2 50 m
4 m	4 m	nil	nil	3.80 m
10 m 11 m	10 m 10 m	11 m 11 m	11 m 11 m	10 m 11 m
14 m —	14 m nil	14 m nil	14 m nil	14 m nil
18 m not allowed	15 m not allowed	18 m	— —	18 m 22 m
10 t 14.5 t	10 t	13 t 14.7 t to 21 t (1)	distance between axles 0.90 m : load 6.5 t 1.50 m : load 9.5 t for the most heavily loaded axle(5)	8 t 14 t if 1 m < d < 2 m (d = distance between centre lines of twin axles)
10 t (14 t (4) 12 t (18 t (4) 14.5 t. But : if there are 3 axles (4) if there are 4 axles (4) if there are 5 axles (4)	16 t 21 t	19 t (2) 26 t 35 t	14 t (6) 19 t (6) 30 t (6)	15 t + 1.25 t (D — 3) D being the distance in m between the centre lines of the outer axles.
sum of the respective maxima	21 t non allowed	35 t	30 t (6) not provided for	— —
—	nil	nil	—	nil
ndard type submitted he approval of the Ministry	—	—	—	—

not less than 1 m, the maximum weight may reach 14 t in the case of 2 axles vehicles and 18 t in the case of 3 axled nicles.

cording to the same conditions, an articulated vehicle may weigh 18 t if it has 3 axles, 28 t if it has 4 axles and 32 t t has 5 axles or more.

increase of 250 kg is allowed for every increase of 5 cm in the distance between two adjoining axles, but the load must t in any case exceed 9.5 t.

e most heavily loaded axle must not carry a load of more than 9.5 t.

APPENDIX II — 5.

Stock of road vehicles.

Table A. — AUSTRIA.

Distribution of lorries according to their useful load.

Useful load in kg	*Lorries*		*Percentage of vehicles used for public transport*	*Percentage of the total number of vehicles*	*Percentage of vehicles used for public transport*
	Altogether	*Used for public transport*		*with the useful load capacity given below*	
Delivery-van :					
up to 500	8 852	97	1	14	1
501 to 1 000	14 572	247	2	22	2
Small lorries :					
1 001 to 1 500	6 452	301	5	10	3
1 501 to 2 000	3 989	278	7	6	3
Average sized lorries :					
2 001 to 2 500	1 875	391	21	3	4
2 501 to 3 000	5 883	1 554	26	9	14
3 001 to 3 500	5 254	1 534	29	8	14
3 501 to 4 000	8 540	2 290	27	13	21
Heavy lorries :					
4 001 to 4 999	4 983	1 941	39	8	18
5 000 to 5 099	3 268	1 445	44	5	13
6 000 to 6 999	1 182	623	53	2	6
7 000 and more	289	133	46	0	1
not defined	283	25	9	0	0
Total	65 422	10 859	17	100	100

Owing to the special form of the Austrian statistics dealing with lorries, it was not possible in the reply to keep exactly to the method of distribution asked for.

Stock of road vehicles (*continued*). APPENDIX II — 5.

Table B. — BELGIUM

Make up of the stock of road vehicles.

Vehicles	*Useful tonnage*								*Total*
	from 3 to 5.9 t		*from 6 to 8.9 t*		*from 9 to 14.9 t*		*over 15 t*		
	Number	*%*	*Number*	*%*	*Number*	*%*	*Number*	*%*	
General position as at 1-8-1956									
1° Lorries and tractors (public and private transport)	40 632	84.7	5 631	11.8	1 603	3.3	118	0.2	47 984
2° Trailers and semi-trailers (public and private transport): no figures available concerning the useful load.									
Position as regards public transport vehicles as at 30-6-1958									
1° Lorries, tractors, trailers and semi-trailers licensed for over 25 km	4 805	50.7	2 338	24.8	1 643	17.3	681	7.2	9 467
2° Ditto licensed up to 25 km	—		—		—		—		19 130

Evolution of the stock :
in 1954 : 132 052 vehicles (100 %) — in 1956 : 144 146 vehicles (109.2 %) — in 1958 : 158 714 vehicles (120.2 %).

Stock of road vehicles (*continued*). APPENDIX II — 5.

Table C. — GREECE

Make up of the stock of road vehicles in 1956.

Types of vehicles	*Useful tonnage*								*Total*
	from 3 to 6.5 t		*from 6.6 to 7 t*		*from 7 to 12.9 t*		*over 7 t*		*Special vehicles*		
	Number	*%*	*Number*	*%*	*Number*	*%*	*Number*	*%*	*Number*	*%*	
Lorries											
Public transport	8 536		296				266		87		9 185
Private transport	2 190		128				123		59		2 500
	10 726		424				389		146		11 685

Stock of road vehicles (*continued*). APPENDIX II — 5.

Table D. — FRANCE

Make up of the stock of road vehicles on 1st January 1958.

Type of vehicles	Useful tonnage								Total	
	from 3 to 6.5 t		from 6.6 to 8.9 t		from 9 to 12.9 t		over 13 t			
	Number	%	Number	%	Number	%	Number	%	Number	%
Lorries and special vehicles (1)										
Public transport	36 000	14 %	13 400	5.1 %	12 700	5 %	2 600	1.– %	64 700	25.– %
Private transport	152 200	59 %	25 300	9.7 %	14 500	5.6 %	1 600	0.6 %	193 600	75.– %
Total . . .	188 200	73 %	38 700	14.8 %	27 200	10.6 %	4 200	1.6 %	258 300	100.– %
Evolution as + or — during the last 2 years		+ 4 %		+ 10 %		+ 60 %		— 5 %		
Trailers										
Public transport	4 150	4.8 %	1 250	1.5 %	1 050	1.2 %	650	0.6 %	7 100	8.1 %
Private transport	64 000	73.2 %	11 200	13.– %	4 000	4.5 %	1 050	1.2 %	80 250	91.9 %
Total . . .	68 150	78.– %	12 450	14.5 %	5 050	5.7 %	1 700	1.8 %	87 350	100.– %
Evolution as + or — during the last 2 years		+ 3 %		+ 3 %		+ 8 %		+ 18 %		
Semi-trailers										
Public transport	2 200	9 %	1 650	6.8 %	2 100	8.5 %	3 800	15.4 %	9 750	39.6 %
Private transport	8 100	33 %	1 500	6.– %	2 750	11.2 %	2 500	10.1 %	14 850	60.4 %
Total . . .	10 300	42 %	3 150	12.8 %	4 850	19.7 %	6 300	25.5 %	24 600	100.– %
Evolution as + or — during the last 2 years		+ 9 %		+ 20 %		+ 17 %		+ 85 %		
Stock of lorries and semi-trailers as a whole (2)										
Public transport	38 200	13.5 %	15 050	5.3 %	14 800	5.2 %	6 400	2.2 %	74 450	26.3 %
Private transport	160 300	56.6 %	26 800	9.5 %	17 250	6.1 %	4 100	1.5 %	208 450	73.7 %
Total . . .	198 500	70.1 %	41 850	14.8 %	32 050	11.3 %	10 500	3.7 %	282 900	100.– %

The percentage of increase of the whole stock during the last two years was respectively for each type of vehicle : lorries : + 14 % — trailers : + 5 % — semi-trailers : + 28 %.

The increase from year to year : in the case of lorries tends to become stable — in the case of trailers, to decrease — and in the case of semi-trailers to increase.

(1) There are no separate statistics for the special types of vehicles.

APPENDIX II — 5.

Stock of road vehicles (*continued*).

Table E. — SWITZERLAND.

Make up of the stock of road vehicles as at 30th September 1958.

Types of vehicles	*Useful tonnage*		*Special vehicles*		*Total*
	1 t and over				
	Number	%	*Number*	%	
LORRIES					
Public transport (1)					
Private transport (2)					
Total . . .	31 057	94	2 083	6	33 140
Evolution as + or — during the last 2 years		+ 3.9		+15.9	
TRAILERS					
Public transport (1)					
Private transport (2)					
Total . . .	20 596	77	6 278	23	26 874
Evolution as + or — during the last 2 years		+ 5.7		+14.4	
SEMI-TRAILERS					
Public transport (1)					
Private transport (2)					
Total . . .	—	—	—	—	—
Evolution as + or — during the last 2 years.					

(1) Transport on behalf of a third party
(2) Transport on owners behalf

} In Switzerland, there are no statistics distinguishing the two.

Stock of road vehicles (*continued*)

Table F. — MALI FEDERATION

Make up of the stock of road vehicles as at 31st December 1957.

Types of vehicles	*Country*	*Useful tonnage*								*Total*
		from 3 to 6.5 t		*from 6.6 to 8.9 t*		*from 9 to 12.9 t*		*from 13 t and more*		
		Number	*%*	*Number*	*%*	*Number*	*%*	*Number*	*%*	
Lorries	*Senegal*	4 462	92.72%	275	5.72%	63	1.31%	12	0.25%	4 812
	Sudan	2 202	96.50%	58	2.54%	22	0.96%	—	—	2 282
	Total	6 664		333		85		12		7 094
Trailers	*Senegal*	88	53.66%	26	15.85%	32	19.51%	18	10.98%	164
	Sudan	6	22.22%	15	55.56%	6	22.22%	—	—	27
	Total	94		41		38		18		191
Semi-trailers	*Senegal*	14	12.50%	13	11.60%	66	58.90%	19	17 %	112
	Sudan	4	100%	—	—	—	—	—	—	4
	Total	18		13		66		19		116
Special vehicles	*Senegal*	187	76.63%	33	13.52%	19	7.80%	5	2.05%	244
	Sudan	65	91.55%	5	7.04%	1	1.41%	—	—	71
	Total	252		38		20		5		315

APPENDIX II — 5.

Stock of road vehicles (*continued*).

Table G. — ABIDJAN-NIGER RAILWAYS

a) *IVORY COAST*

Types of vehicles	*Useful load*					
	3.5 t	*5 t*	*7 t*	*10 t*	*15 t and more*	*not indicated*
Lorries	3 169	2 146	339	110	2	52
Special vehicles	19	21	5	7	2	1
Very special vehicles	30	20	12	2	—	18
Trailers	3	1	9	2	3	3
Semi-trailers	—	1	12	17	4	3

Tractors	11 to 16HP	17 to 20HP	21 to 25 HP	more than 25 HP
	106	35	58	73

Vehicles belonging to public transport undertakings:

Lorries and delivery-vans	3 107
Special vehicles	6
Very special vehicles	1
Tractors	31
Trailers	4
Semi-trailers	13

b) *UPPER VOLTA*

Types of vehicles	*Useful load*					
	3.5 t	*5 t*	*7 t*	*10 t*	*15 t and m*	*not indicated*
Lorries	485	334	123	13	—	1
Special vehicles	21	4	7	—	—	—
Very special vehicles	6	2	3	2	—	6
Trailers	4	5	2	1	1	15
Semi-trailers	—	1	4	10	12	3

Tractors	11 to 16HP	17 to 20HP	21 to 25HP	more than 25 HP
	9	7	20	22

Vehicles belonging to public transport undertakings:

Lorries and delivery-vans	418
Special vehicles	6
Very special vehicles	—
Tractors	20
Trailers	8
Semi-trailers	20

The stock of vehicles used for public transport mostly consists of vehicles having a useful load capacity of 5 to 6 t, the owners of such vehicles being for the most part local tradesmen of limited means, who have to combine together to buy their stock which they obtain partly on credit and pay for out of their receipts.

In addition, the condition of the roads, especially those giving access to villages at a distance from the main arteries where the hauliers pick up their loads in most cases make it impossible to use large or very heavy vehicles.

The latter type of vehicle is mainly used by a certain number of specialist transport undertakings on well defined routes linking up the important towns. Such heavy vehicles are mainly used for transports over distances exceeding 400 km.

FRENCH NATIONAL RAILWAYS.

U.F.R. SOLUTION WITH LATERAL GUIDING.

The U.F.R. solution with lateral guiding makes use of a flat wagon of standard height slightly rearranged for this special purpose and a special type of road semi-trailer (fig. 1). The guiding makes it possible :

(F.A.R. type) or the standardised eye bolt coupling (B.N.A. type). The semi-trailer with the F.A.R. system of coupling has a balanced gathering horn with automatic dropping (3 of fig. 2).

The carrying wheels are fitted on the outside with auxiliary rims with steel flanges (1 of fig. 2) and the auxiliary wheels fitted at the front on suspension springs are also flanged wheels (2 of fig. 2).

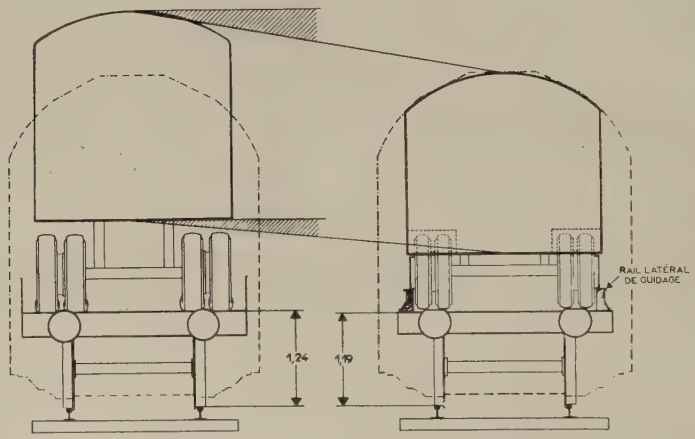


Fig. 1. — Road semi-trailers carried on wagons, U.F.R. system.

— on the one hand, to make the fullest use of the available loading gauge, no margin of safety having to be allowed for possible errors in centering the load;

— on the other hand, to speed up loading which necessarily has to be done by backing the semi-trailer since the tractor has afterwards to be removed.

I. Characteristics of the U.F.R. semi-trailers.

When running on the road, the U.F.R. semi-trailer can be coupled up to any type of tractor provided it is fitted according to the type of semi-trailer, with the bar coupling

When being loaded onto a wagon, the semi-trailer runs by means of these auxiliary rims on the two rails fitted longitudinally on the wagons; it then no longer rests on its pneumatic tyres (see Plate D).

The U.F.R. rail-road semi-trailers, like all road vehicles, may have any type of coachwork. In particular, there are :

— 7.7 t, 10 t or 19.6 t flat trailers;

— metal vans of 7.7 t (Plate A), 10 t or 19.5 t useful load, having a respective capacity of 26, 34 or 46 m^3;

— isothermic refrigerated vans of 5.5 t useful load, having a capacity of 20 m^3;

— tank wagons of 80 or 200 hl (Plate B) capacity;

— gas cylinders of 122 or 200 hl.

II. Characteristics of the carrying wagons (Plates C and D).

A. *Main characteristics :*

— overall width. . . . . 13.240 m

— useful length . . . . . 12.000 m

— tare . . . . . 10.3 t

— load limit . . . . . 25.5 t

with speed restricted to 100 km/h (18 t limit per axle).

When the wagon is carrying one high capacity semi-trailer, this must be loaded in such a way that its weight is equally distributed over the two axles of the wagon;

— height of wagon platform :

— empty :

from the floor of the wagon. 1.186 m
from the guiding rails . . . 1.470 m

— loaded with one or more empty road vehicles about :

from the floor of the wagon. 1.170 m
from the guiding rails . . . 1.454 m

— coupling : Standard U.I.C.;

— two axles with 1 m diameter wheels;

— axle boxes with pad lubricator bearings or with mechanical greasing or roller bearings, according to the series.

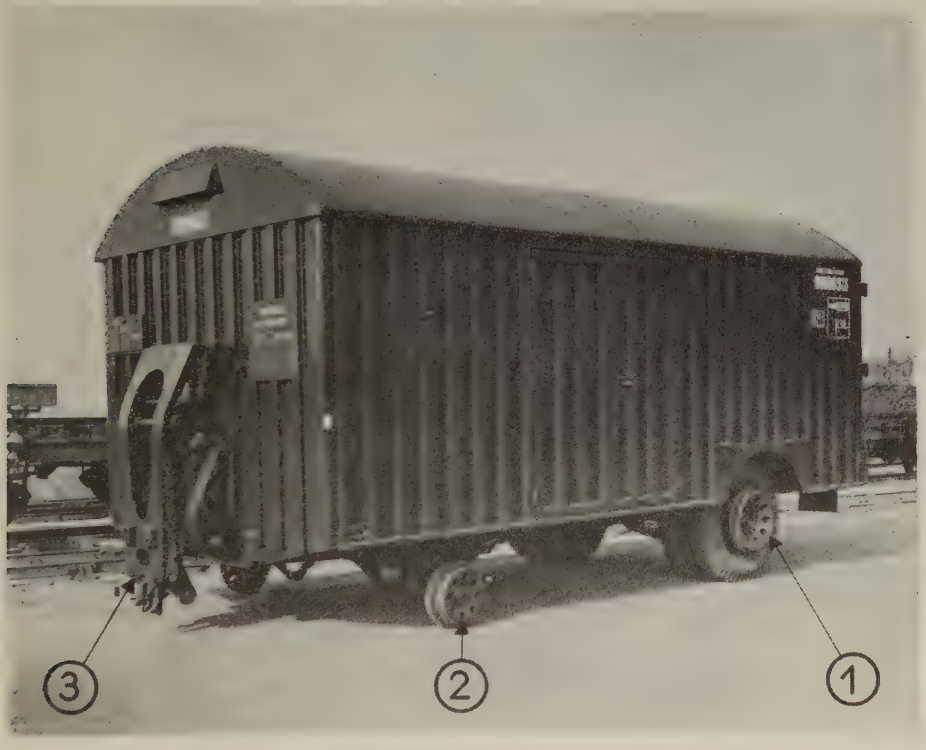


Fig. 2.

B. *Description of the special features of the wagon :*

The wagon is fitted :

— over its whole length with fixed rails for the lateral guiding (4 of fig. 6);

— at the ends with movable dropable rails

(5 of fig. 6) allowing of the intercirculation of the semi-trailers when being loaded:

— from wagon to wagon;

— from the deadend dock (with loading device) to the wagon;

— at the ends likewise with movable gangways (6 of fig. 6) also assuring intercirculation at the moment of loading and

pleted by an arrangement of clamps gripping the sides of these rails (fig. 4).

It should be noted that should any particularly violent shocks occur, the design of the wedges and the limited tightness of the clamps allows of a certain displacement which assures that part of the shock is absorbed, thus saving the load of the trailer or trailers.

Fig. 3.

supporting the pneumatic wheels of the trailers.

This wagon can carry two 7.5 t (fig. 3) semi-trailers or one 10 t or 19.5 t semi-trailer.

III. **Securing device.**

The trailers are secured by double wedges (one double wedge per wheel), which slide along the guiding rails of the wagon and are fixed in position when loading is com-

IV. **Loading gauge.**

The semi-trailer or semi-trailers, taken as being empty, must when loaded onto the wagon fit within the general international loading gauge without any safety margin (Plate E).

V. **Loading regulations.**

The loading of the U.F.R. semi-trailers onto the wagon necessitates straight sections of track being available (Plate F).

In general, an end dock is made use of, the usual slope of the access ramp being 10 %. The semi-trailer is loaded by being backed onto the carrying wagon, tractor and semi-trailer being either on ground level or on the platform (according to its size). The device for centering the semi-trailer and getting it onto the rails consists of :

— either one loading trolley (fig. 5) with no suspension gear and a very small wheelbase, which has runways, widened out access ramps, and floor components which can be moved transversally to avoid damaging the pneumatic tyres;

— or by a semi-fixed loader (fig. 6) built into the platform. This device is similar to a loading trolley but without its buffing and running gear. There are no runways.

Fig. 4.

The trailers are backed onto the rake of wagons. When they are not exactly centred on the wagons, the lateral part of the rear auxiliary wheels (1 of fig. 2) hits the side checks of the loading device (1 of fig. 5

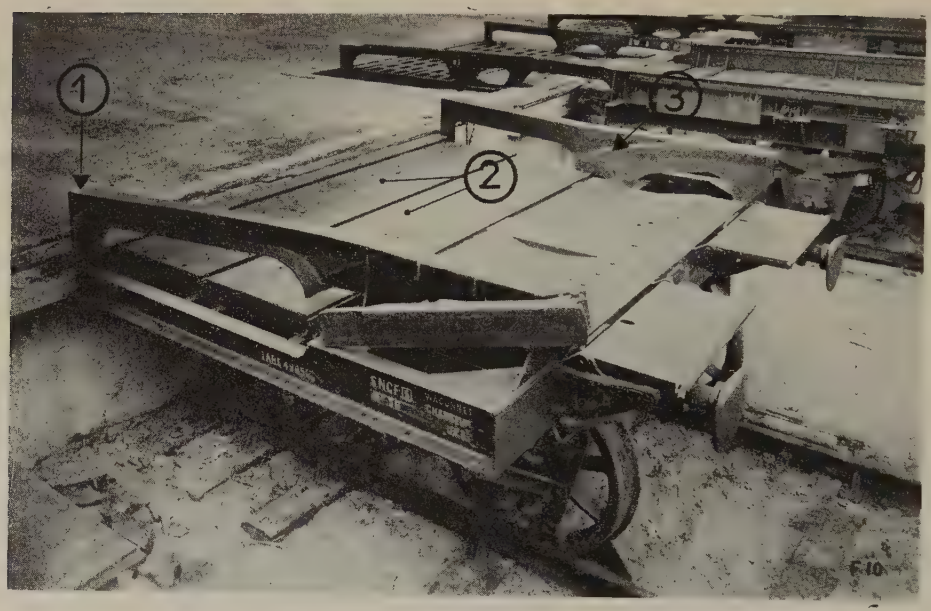


Fig. 5.

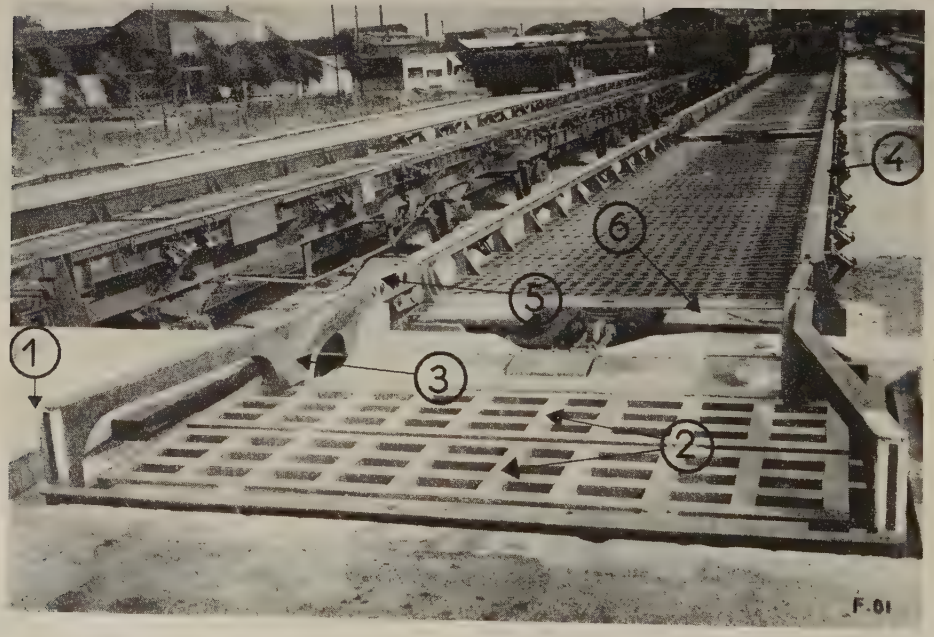


Fig. 6.

and 6). Thanks to the movable panels (2 of fig. 5 and 6) the resultant return shock moves the trailer over sideways. The auxiliary flanges of the back wheels then come into contact with the loading ramp (3 of fig. 5 and 6) and then with the guiding rails of the wagons (fig. 7).

Fig. 7.

In stations with little traffic the S.N.C.F.:

— either makes use of simplified ramps (Plate F);

— or makes use of special loading trolleys which can be reached from the existing side platforms. These vehicles (fig. 8) have no tracks; their floor is strengthened to allow tractors to move on them. At each end, they are fitted with loading ramps to the tracks of the carrying wagons. These ramps are flared out in order to assure the automatic centering of the trailers, and movable parts of the floor which can move sideways with spring recall avoiding damage to the pneumatic tyres. Gangways and movable rails assure intercommunications between adjacent vehicles.

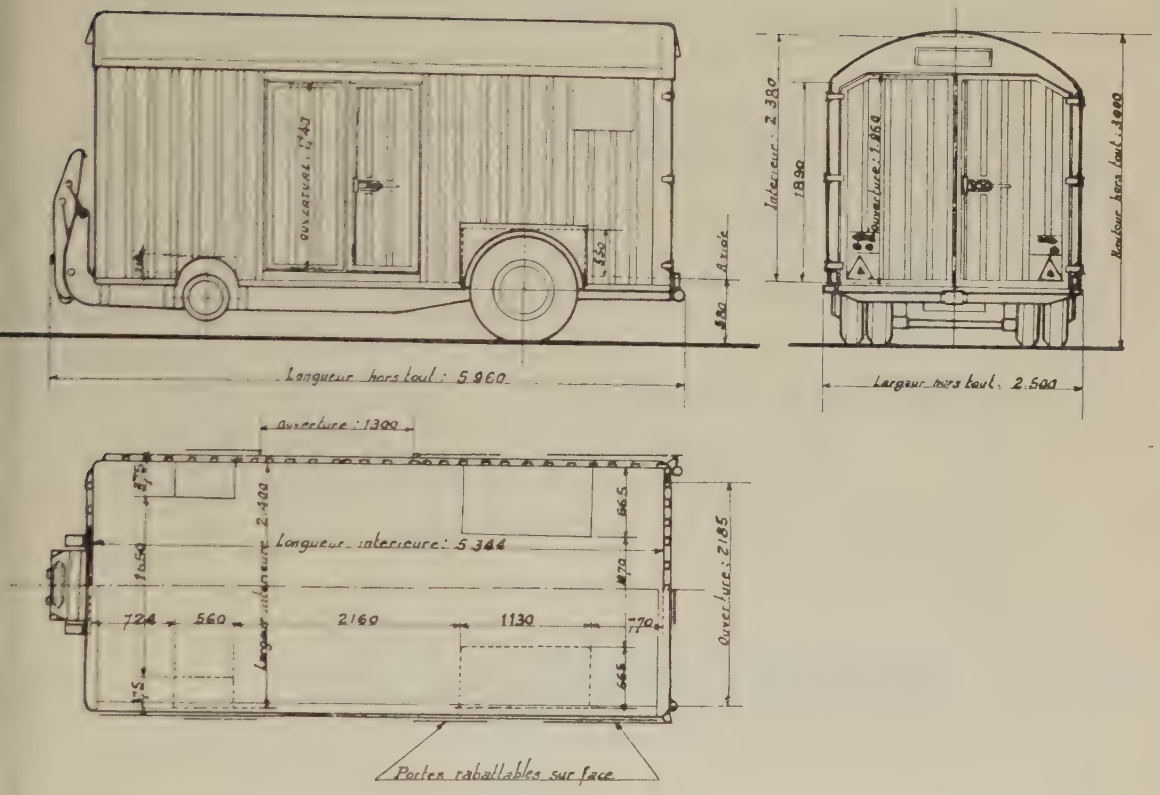
The use of these lateral trolleys does not

Fig. 8.

involve any special fixed installations and makes it possible to unload the trailers no matter what position they are in when they arrive at the platform. However, their use is restricted to stations recently opened to this traffic, whilst awaiting confirmation of the development of this new type of traffic, as loading takes longer in this way and this device is not suitable for handling large capacity trailers.

APPENDIX II — 6.

PLATE A.



U.F.R. Department.
KS.M[6] van type semi-trailer.

Characteristics :

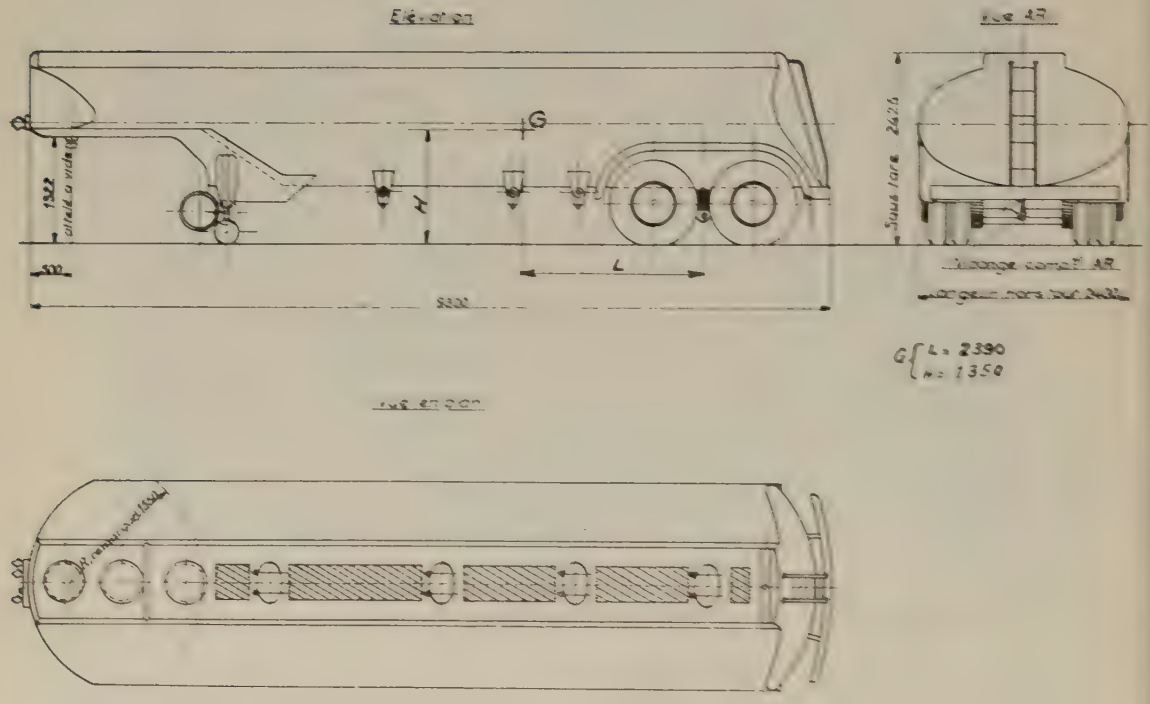
Tare	3.5 t	Total weight loaded	11 t
Load	7.5 t	Useful cubic capacity	28.5 m³

Explanation of French wording :

Ouverture : 1 740 = opening 1 740. — Longueur hors tout : 5 960 = overall length : 5 960. — Largeur hors tout : 2 500 = overall width : 2 500. — Ouverture : 1 300 = opening : 1 300. — Largeur intérieure : 2 400 = inside width : 2 400. — Longueur intérieure : 5 344 = inside length : 5 344. — Ouverture : 2 185 = opening : 2 185. — Portes rabattables sur face = sliding doors. — Intérieur : 2 380 = inside : 2 380. — Ouverture : 1 960 = opening : 1 960. — Hauteur hors tout : 3 000 = overall height : 3 000. — A vide = empty.

APPENDIX II — 6.

PLATE B.



U.F.R. Department.

Tanker semi-trailer type C 200 with dome.

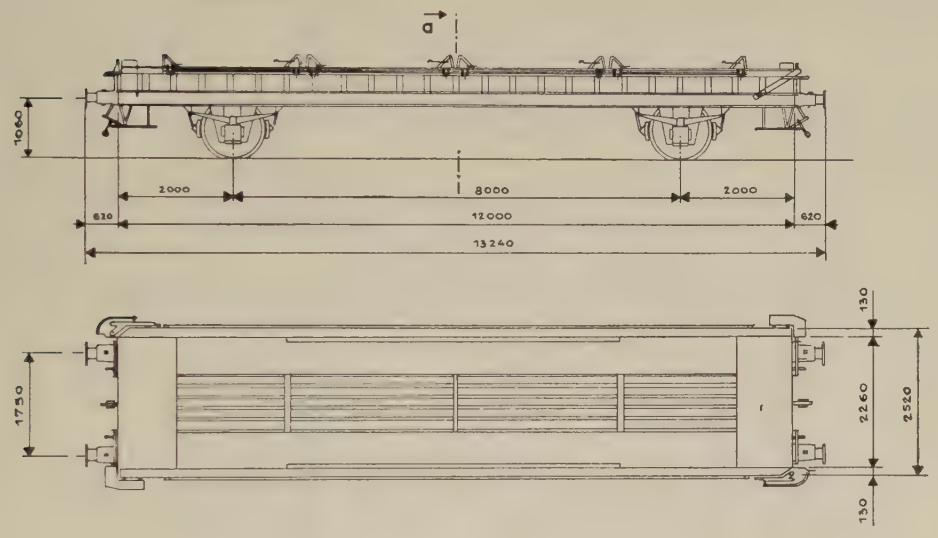
Characteristics :

Tare	5.9 t
Total weight loaded	25.5 t
Capacity	200 hl

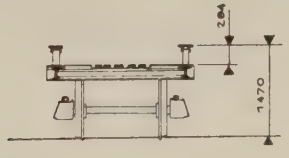
APPENDIX II — 6.

PLATE C.

Ordinary flat wagon arranged for the transport of U.F.R. semi-trailers.



coupe a



General characteristics :

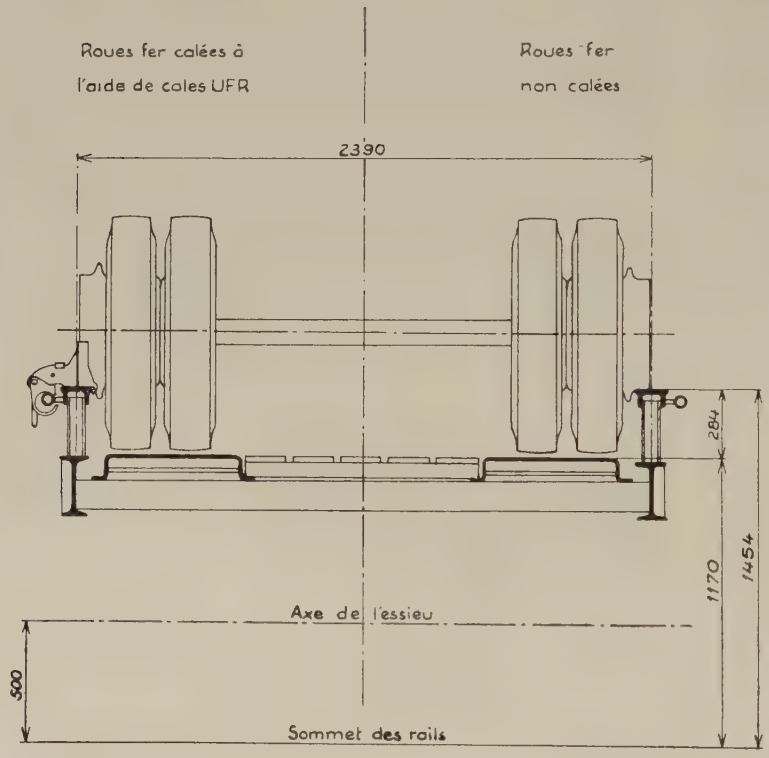
Normal load Maximum load	25.5 t	Axles	9003 A type
Tare	10.3 t	Axle boxes	Athermos S 9 A type
Chassis	welded metal	Wheels	1 m diameter
Traction	discontinuous, articulated		
Platform	centre portion — oak end portions corrugated sheet	Brake	automatic compressed air graduated release

APPENDIX II — 6.

PLATE D.

Ordinary flat wagon adapted to carry U.F.R. semi-trailers.

Transverse section.



Nota. — The distances from the rails are for up to date wagons with 6 t load, in new condition.

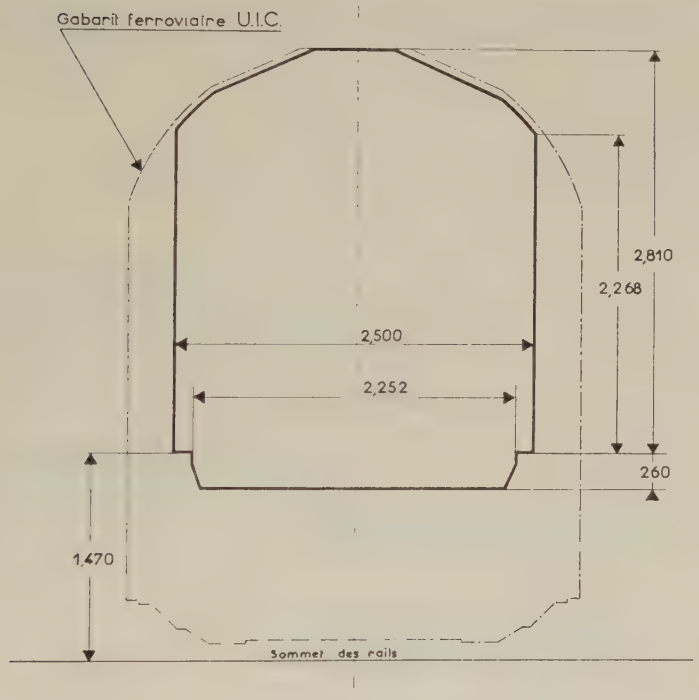
Explanation of French wording :

Roues fer calées à l'aide de cales U.F.R. = cast iron wheels secured by means of U.F.R. wedges. — Roues fer non calées = iron wheels not wedged. — Axe de l'essieu = centre line of the axle. — Sommet des rails = top of rails.

APPENDIX II — 6.

PLATE E.

Maximum loading gauge authorised for U.F.R. semi-trailers carried on flat wagons.

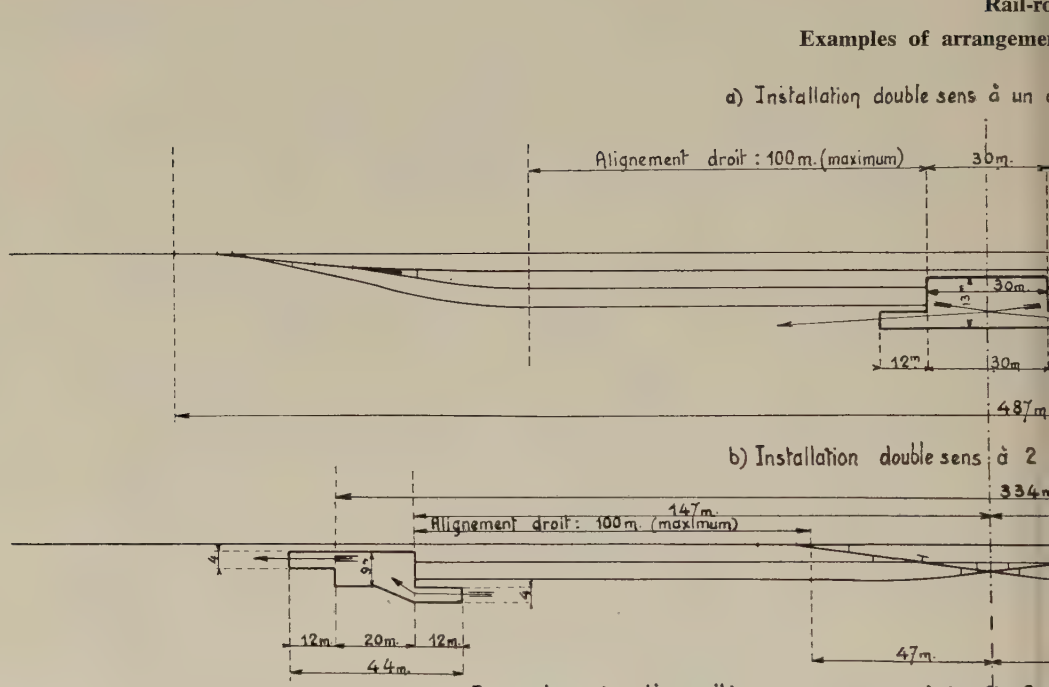


Explanation of French wording :

Gabarit ferroviaire U.I.C. = U.I.C. railway gauge. — Sommet des rails = top of rails.

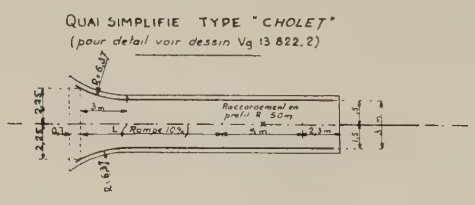
Rail-ro

Examples of arrangeme



Exemples de dispositions pour gares à trafic fai

Prévoir au pied de la rampe une aire d'évolution de 20 m. x 20 m.

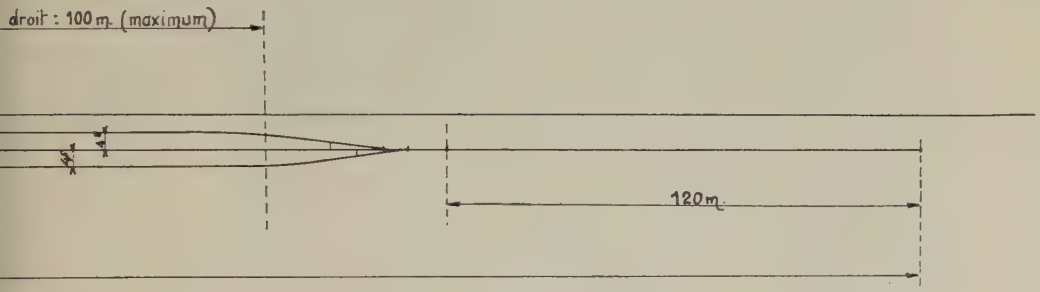

QUAI SIMPLIFIE TYPE "CHOLET"
(pour détail voir dessin Vg 13 822.2)
Raccordement en profil R 50m
Rampe (10%)
3m
2,25
2,25
2,25

APPENDIX II — 6.

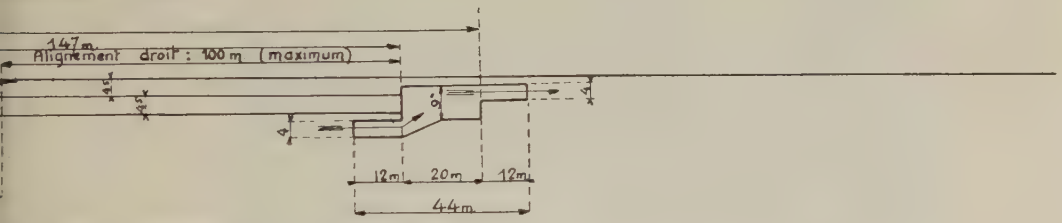
ns.

s with heavy traffic.

d'un seul côté

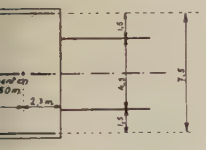


serte des 2 côtés

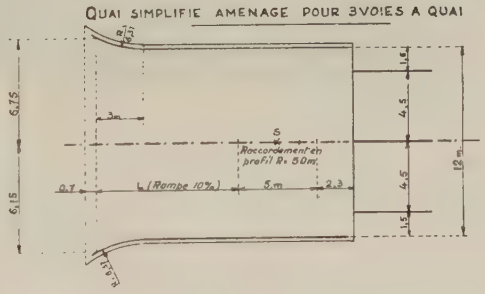


en (exploitées, en principe, avec wagonnet chargeur)
au minimum de 16m x 16m

POUR 2 VOIES A QUAI



QUAI SIMPLIFIE AMENAGE POUR 3VOIES A QUAI



rding :

Served from one side only. — Alignement droit : 100 m (maximum) = straight alignment : 100 m platforms. Served from both sides. — Exemples de dispositions pour gares à trafic faible ou 20 m × 20 m si possible et, au minimum, de 16 m × 16 m = examples of arrangements at manœuvring must be provided 20 m × 20 m if possible, or a minimum space of 16 m × 16 m. — details see drawing Vg 13 822.2). — Quai simplifié aménagé pour deux voies à quai = simplified for three tracks to the platform. — *Nota :* Hauteur des quais rail-route : 1.15 m au-dessus du

FRENCH NATIONAL RAILWAYS.

S.E.G.I. LOW LOADING BOGIE WAGON SOLUTION.

This solution has been adopted for the transport of lorries, trailers and possibly tractors.

I. Characteristics of the carrying wagons.

Flat wagons of special low-loading design on bogies.

A. *Main characteristics*

(Plates A, B and C).

— overall width . . . . . 2.650 m

— useful length :

12.500 m in the case of the intermediate wagon;

11.000 m approx. for the end wagon;

— tare :

16 t for the intermediate wagon;

17 t for the end wagon;

— useful load :

34 t for the intermediate wagon;

33 t for the end wagon;

(12.5 t max. load per axle).

The load must be approximatively centred on the centre line of the wagon.

Height of wagon platform :

— empty . . . . . 0.781 m

— loaded with one or more empty road vehicles . . . . . 0.773 m

Coupling :

— standard U.I.C. for the ends of the rake of wagons which consists of two end wagons and the intermediate wagons;

— automatic Willison lowloader type for the intermediate wagons.

Two bogies with 660 mm diameter wheels.

Roller bearing axle boxes.

Maximum speed allowed : 100 km/h.

The following special feature should be noted :

The lowering of the wagon platform made it necessary to adopt 0.660 m diameter wheels. The damaging character of such wheels as regards the track when running at 100 km/h made it necessary to reduce the axle load to 12.5 t instead of the 18 t allowed in the case of wagons with standard wheels.

In view of the fact that the heaviest lorries authorised by the French Highway Code have a weight of 26 t, the weight tare of the wagon + weight of the loaded road vehicle represents :

$$26 + 16 = 42 \text{ t.}$$

B. *Description of the special features of the wagon.*

The wagons have :

— on the one hand, central frame members arranged above the lateral running tracks;

— on the other hand, movable side members formed of toothed bars or racks.

Between these racks and the sides of the central members (which also have openings (at spaced regular intervals equal to those between the teeth of the bars), it is possible to insert cross bars to take the wedges as described below.

A set of fixed and retractable gangways allows of intercirculation between the wagons and between the wagon and loading ramp.

II. Characteristics of the road vehicles carried.

No special characteristics are stipulated, provided that they will pass the railway loading gauge as indicated in § IV below (fig. 1).

III. Securing device.

This is assured by simple wedges made of light alloy, slightly elastic and adjustable, into which the crosspieces are fitted as indicated above; these also are made of light alloy. The operation of wedging is carried out very quickly (fig. 2, hereafter).

Fig. 1.

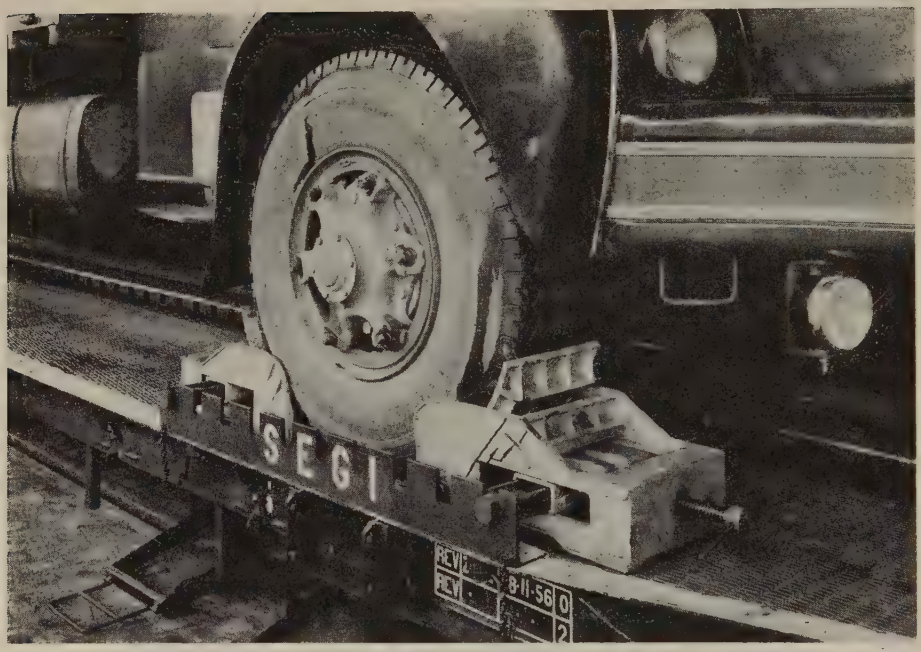


Fig. 2.

IV. **Loading gauge.**

The application of the conditions of passing through the international loading gauge has led to the maximum size of road vehicles loaded onto S.E.G.I. low loading wagons to be laid down, according to the transversal section shown in the attached document (Plate D).

A safety margin of 75 mm has been included to take into account possible errors in centering the vehicles on the wagons.

V. **Loading regulations.**

Loading is carried out from ground level by means of a mobile ramp (Plate E) at the end of the wagon, beside the central coupling.

It should be noted that the end wagon can be used to load or unload from an end platform. The inclined part at the end is made of several movable parts, made of light alloy, which can be placed in coffers attached under the wagon frame, so as to provide a sufficient length for loading on the wagon.

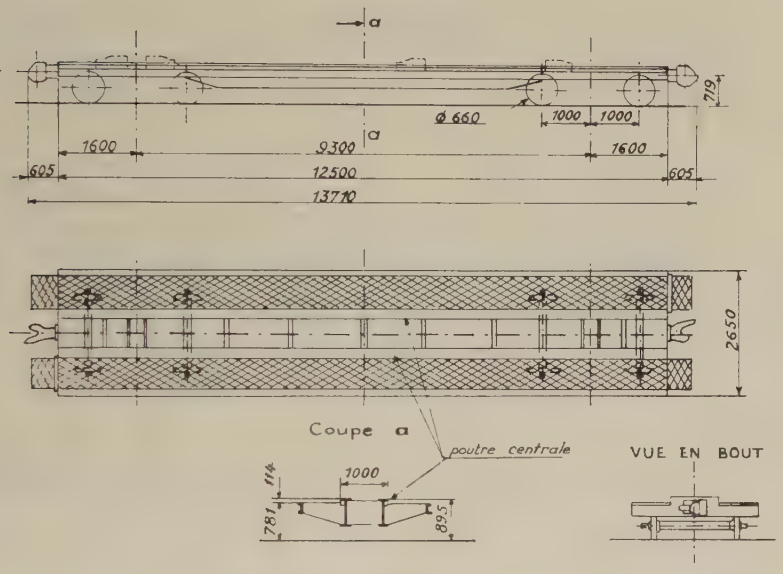
Loading only necessitates, in the case of each train, a straight section of track, a small length of which is in a dock so that the mobile ramp can be brought up and removed.

Loading and unloading of the lorries is done moving forwards (Plate F).

APPENDIX II — 7.

PLATE A.

Intermediate low loader wagons for the transport of road vehicles: lorries, trailers, tractors.



Nota. — The distances from the rails are given for an empty wagon, in new condition.

General characteristics:

Normal load	34 t	Platform	wedging device: C.N.C. wedges floor: currugated steel sheets
Maximum load. . . .			
Tare	16 t	Bogie Y 17 A	axle type 957 roller bearing axle boxes laminated springs with variable flexibility 0.660 m diameter wheels
Wagon with central beam:			
Frame	welded metal	Brake . . .	automatic compressed air with graduated release
Traction	automatic coupling		

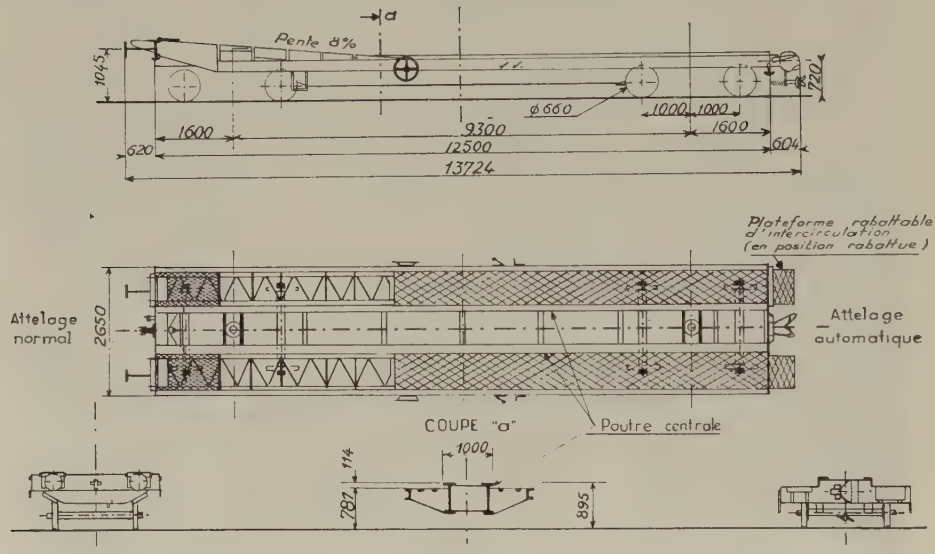
Explanation of French wording:

Coupe a = section a. — Vue en bout = end view. — Poutre centrale = centre frame members.

APPENDIX II — 7.

PLATE B.

End low loader wagon for transporting road vehicles : lorries, trailers, tractors.



Nota. — Distances from rail level are given for an empty wagon, in new condition.

General characteristics :

Normal load . . . . . } 33 t
Maximum load . . . . . }

Tare . . . . . 17 t

Frame . . . . . welded metal

Traction { automatic coupling
standard coupling { drawhook : 100 t
screw : 85 t

Buffers : with reinforced rubber springs

Bogie Y 17 A { axle type 957
roller bearing axle boxes
laminated springs of variable flexibility
0.660 m diameter wheels

Brake . . . { automatic compressed air
graduated release
screw type

Platform . . { wedging device : C. N. C. wedges
floor of chequered steel sheet

Explanation of French wording :

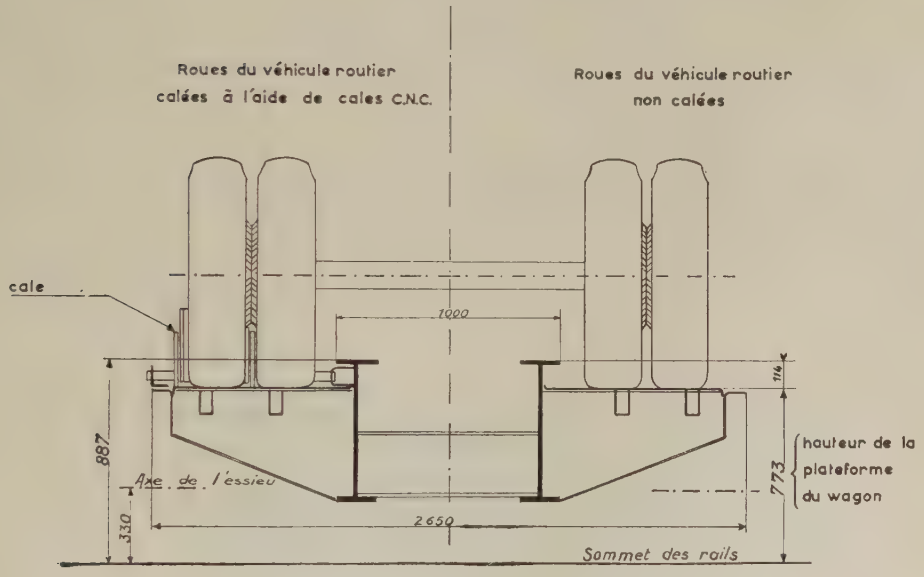
Attelage normal = standard coupling. — Plate-forme rabattable d'intercirculation (en position rabattue) = retractable platform for intercirculation (in raised position). — Attelage automatique = automatic coupling. — Poutre centrale = central frame members.

APPENDIX II — 7.

PLATE C.

Low-loader wagon for carrying road vehicles (lorries, trailers, tractors).

Transversal section.



Nota. — Distances from rails are given for a wagon with 4 t load, in new condition.

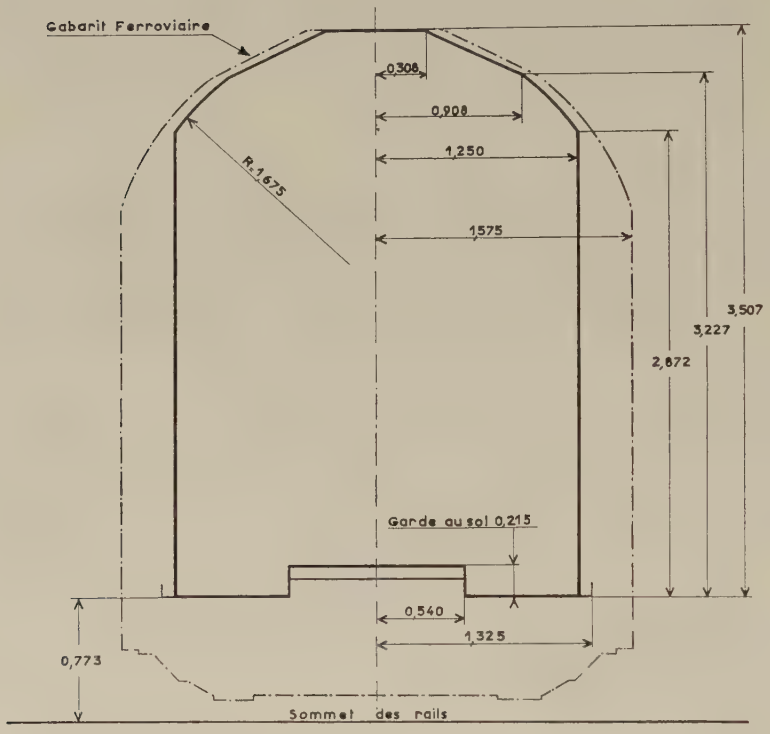
Explanation of French wording :

Roues du véhicule routier calées à l'aide de cales C.N.C. = wheels of road vehicles wedged by means of C.N.C. wedges. — Roues du véhicule routier non calées = wheels of road vehicle not wedged. — Hauteur de la plate-forme du wagon = height of wagon platform. — Sommet des rails = top of the rails. — Cale = C.N.C. wedge. — Axe de l'essieu = axle centre.

APPENDIX II — 7.

PLATE D.

Maximum loading gauge allowed for road vehicles (lorries, trailers, tractors) loaded onto low loader bogie wagons.



Nota. — The distance from the rails is given for a wagon with 4 t load, in new condition.

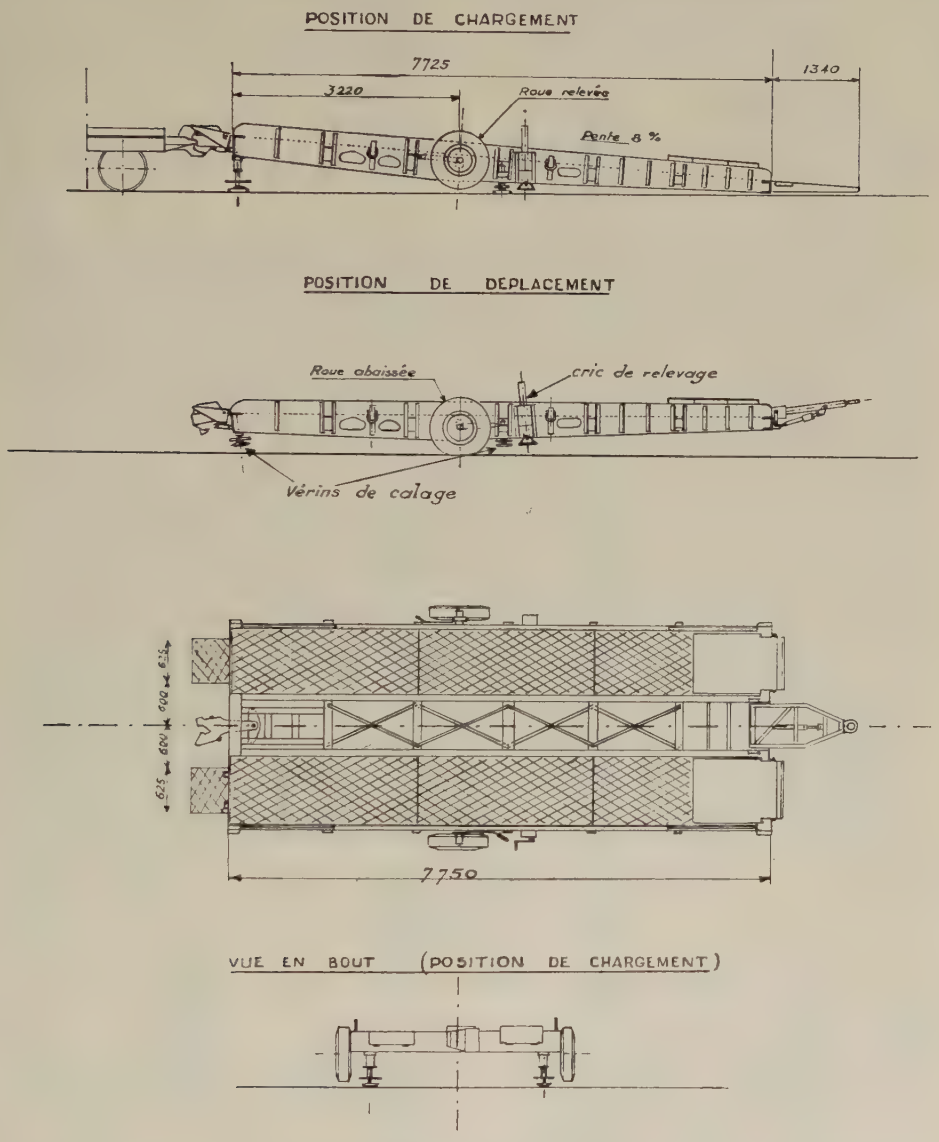
Explanation of French wording :

Gabarit ferroviaire = railway loading gauge. — Sommet des rails = top of the rails.

APPENDIX II — 7.

PLATE E.

Mobile ramp for loading road vehicles onto the low loader bogie wagons.



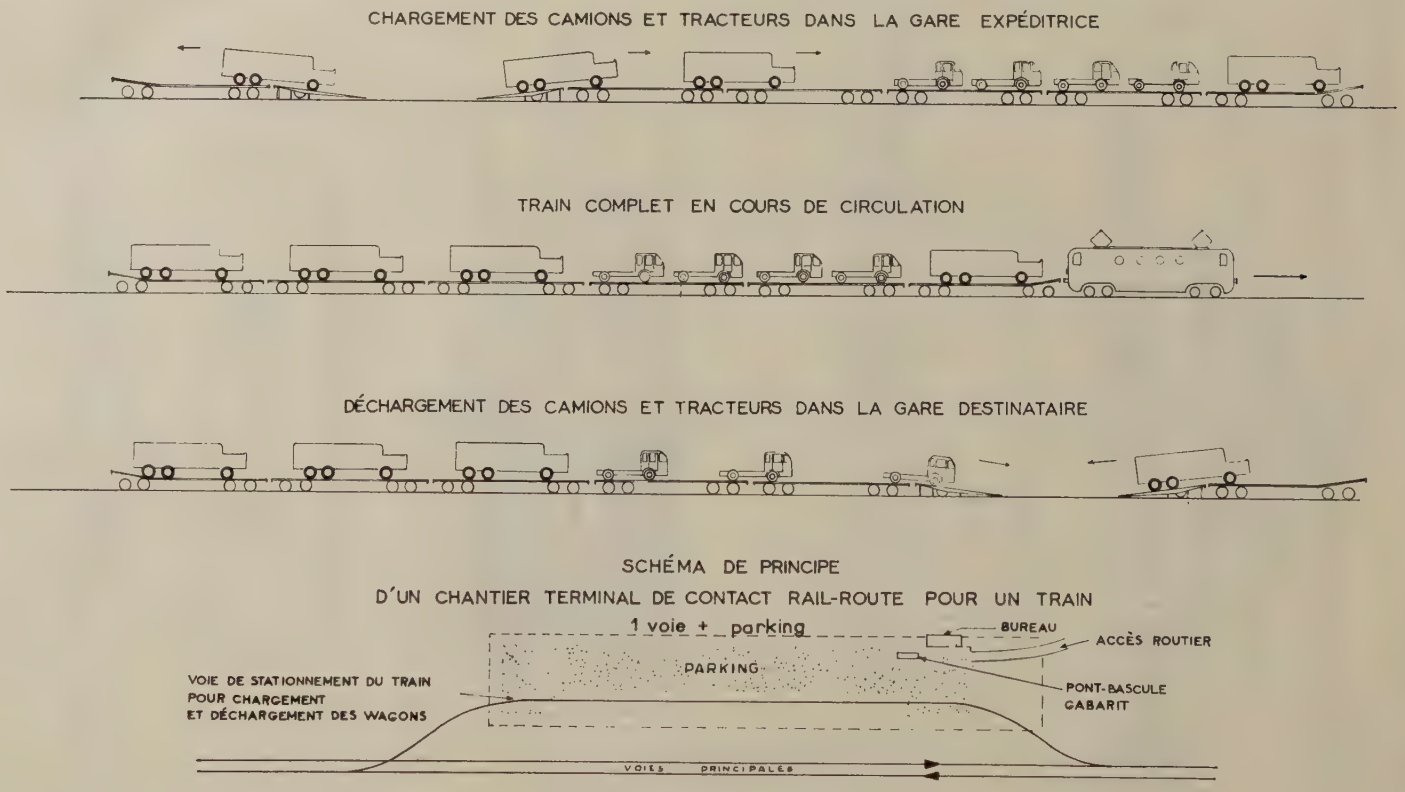
Tare : 4.5 t.

Explanation of the French wording :

Position de chargement = loading position. — Position de déplacement = travelling position. — Vue en bout (position de chargement) = end view (loading position).

PLATE F.

Working a train consisting of low loader wagons for the transport of lorries and tractors.


CHARGEMENT DES CAMIONS ET TRACTEURS DANS LA GARE EXPÉDITRICE
TRAIN COMPLET EN COURS DE CIRCULATION
DÉCHARGEMENT DES CAMIONS ET TRACTEURS DANS LA GARE DESTINATAIRE
SCHÉMA DE PRINCIPE
D'UN CHANTIER TERMINAL DE CONTACT RAIL-ROUTE POUR UN TRAIN
1 voie + parking
BUREAU
ACCÈS ROUTIER
PARKING
VOIE DE STATIONNEMENT DU TRAIN POUR CHARGEMENT ET DÉCHARGEMENT DES WAGONS
PONT-BASCULE GABARIT
VOIES PRINCIPALES

Explanation of French wording :

Chargement des camions et tracteurs dans la gare expéditrice = loading the lorries and tractors in the consigning station. — Train complet en cours de circulation = complete train during the run. — Déchargement des camions et tracteurs dans la gare destinataire = unloading the lorries and tractors at the destination station. — Schéma de principe d'un chantier terminal de contact rail-route pour un train = diagram of the principle of a terminal rail-road depot for a train. — Voie de stationnement du train pour chargement et déchargement des wagons = siding for the train being loaded and unloaded. — 1 voie + parking = 1 track + parking. — Bureau = office. — Accès routier = road access. — Pont-bascule, gabarit = weighbridge, loading gauge. — Voies principales = main lines.

APPENDIX II — 8.

FRENCH NATIONAL RAILWAYS.

S.E.G.I. KANGAROO SOLUTION.

This solution has been retained for the transport of heavy road semi-trailers that have been slightly modified on special wagons.

Its essential characteristics are as follows :

1) the use of a guiding system which makes it possible :
   — on the one hand, to make the maximum use of the loading gauge, as no margin of safety need be allowed for mistakes in centering the vehicle when loading;
   — on the other hand, loading can be speeded up, this having to be done by backing since the tractor has to be removed;
2) practically full utilisation of the railway loading gauge (fig. 1) obtained by housing the semi-trailer between the side solebars of the wagon; whence the name « Kangaroo » given to this method.

I. Characteristics of the road vehicles carried.

Between the twin wheels of the heavy load carrying road vehicles, there is a cylindrical stay intended to ensure a sufficient gap between the pneumatic tyres so that they do not rub against each other when subjected to pressure under load (fig. 2).

With the « Kangaroo » method, this stay, reinforced and specially profiled, becomes a metal wheel similar to that of a wagon, running on the guide rails with which the wagon is equipped, which then takes the weight of

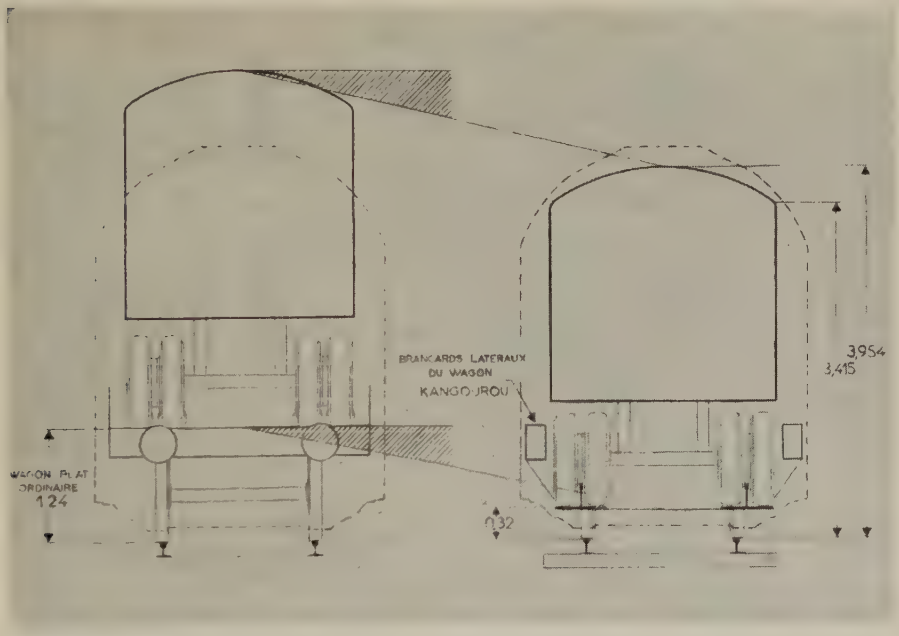


Fig. 1. — Transport of road vehicles on wagon.
S.E.G.I. « Kangaroo » solution.

Explanation of French wording :
Wagon plat ordinaire : 1.24 = ordinary flat wagon : 1.24. — Brancards latéraux du wagon « Kangourou » = side solebar of « Kangaroo » wagon.

the twin wheels, acting as a substitute for them during this period.

The semi-trailers have no particular characteristics apart from the necessary adaptation :

— of the special guiding stays with metal guiding groove, which take the place of the ordinary stays between the twin pneumatic tyres;

— an auxiliary coupling device (spherical device) allowing the front of the semi-trailer to be raised or lowered (this being done by means of an elevator system worked from the special tractor);

— an arrangement of safety plates which can be taken away to prevent these plates being damaged when the semi-trailer is taken off the wagon with the drawbridge lowered.

These road semi-trailers (Plate A) are therefore more or less identical to the ordinary road semi-trailers, for example in the case of a covered van with straight chassis (therefore without passage for wheels) we have :

— useful volume : 53 m³;

— total weight loaded :
25 t with one axle;
29 t with two axles;

— tare :
5.5 t with one axle;
6.5 t with 2 axles.

II. Characteristics of the carrying wagons

(Plates A and B).

Special flat wagons for carrying one semi-trailer, very slightly modified :

A. *Main characteristics :*

— overall width . . . . . 3.065 m
— useful length . . . . . 12.020 m
— tare . . . . . 11 t

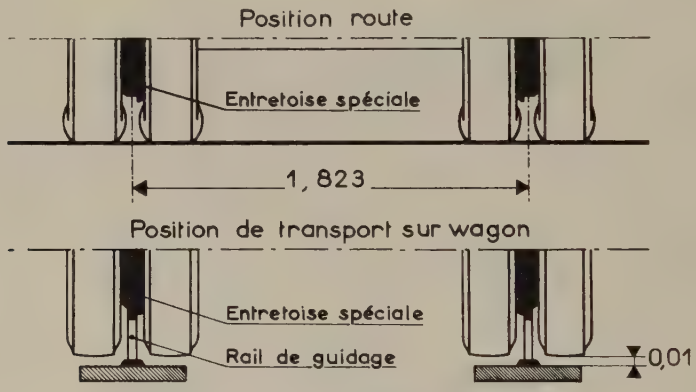


Fig. 2. — Axle of semi-trailer equipped with « Kangaroo » stay.

Explanation of French wording :

Position route = road position. — Entretoise spéciale = special stay. — Position de transport sur wagon = position of transport on wagon. — Entretoise spéciale = special stay. — Rail de guidage = guiding rail.

Useful load :

— 25 t with speed limited to 100 km/h (18 t maximum load per axle);
— 27 t with speed limited to 90 km/h (19 t maximum load per axle);
— 29 t with speed limited to 70 km/h (20 t maximum load per axle).

A suitable distribution of the weight according to the points of support of the semi-trailers is required within the limits of the above maximum useful loads allowed.

Height of the wagon :

a) empty :
— with drawbridge raised (highest point) . . . . . 1.400 m
— with drawbridge lowered (lowest point) . . . . . 0.238 m

b) loaded with a road vehicle fully loaded (condition as new) :

— with drawbridge lowered (lowest point) . . . . . 0.182 m

Coupling : standard U.I.C.

Two axles with 1 m diameter wheels.

Roller bearing axle boxes.

B. *Description of the special features of the wagons.*

The long wheelbase two axled wagon has two longitudinal sills which together with the headstocks form the frame. Above are the guiding runways of the semi-trailers consisting of two parallel rails.

Part of this guide way forms a drawbridge and, pivoting around a horizontal axis, can be in one of two positions, either horizontal or sloping down with a inclination of 13 %; it can be locked in either position. The first position allows the passing over a wagon of the rake of a semi-trailer to be carried on another wagon; the second corresponds to the loading and transport position.

The axle or axles of the semi-trailer, running on their special cross stays on the guide rails run down the drawbridge and fit between the wagon solebars (fig. 3). When the pneumatic types have come up against the back intermediate headstock, the front of the semi-trailer is lowered by a special tractor which we will describe later on, into the horizontal position (fig. 4). The supports are placed within the space between the wagon solebars, the centre of the coupling being fastened in a device similar to a tractor hook into which it is locked.

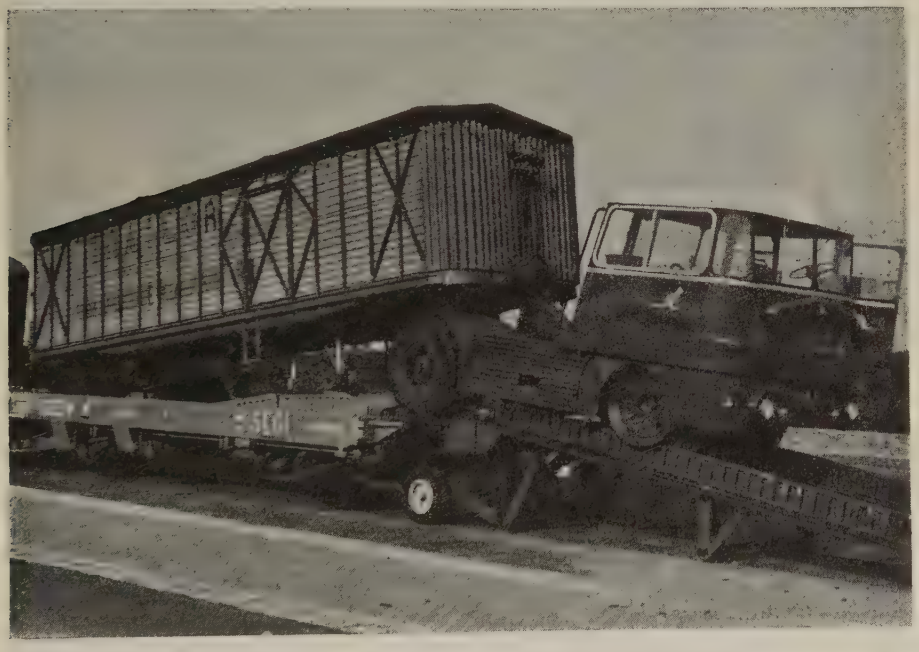


Fig. 3.

Intercirculation from wagon to wagon or from wagon to loading ramp is made possible by gangways, which can be lowered into position, and articulated guide bars.

III. Wedging device.

The semi-trailer is already wedged naturally because it lies on an inclined plane with an end stop; to allow for severe shocks,

Fig. 4.

Fig. 5.

this natural wedging is completed by fitting the vertical drawhook pin of the semi-trailer into the supporting saddle of the wagon mentioned above, which is opposite the low point of the lowered drawbridge.

IV. **Special tractor.**

The enclosure of the semi-trailer, the need to keep it in a horizontal position during the run and the existence of its supports have

led to the designing of a special tractor to load or unload, fitted with an elevator device (fig. 5); the front of the semi-trailer is coupled up to this tractor by means of a spherical component fixed to the frame (1 of fig. 6) which fits into a shoe (2 of fig. 6) on the tractor.

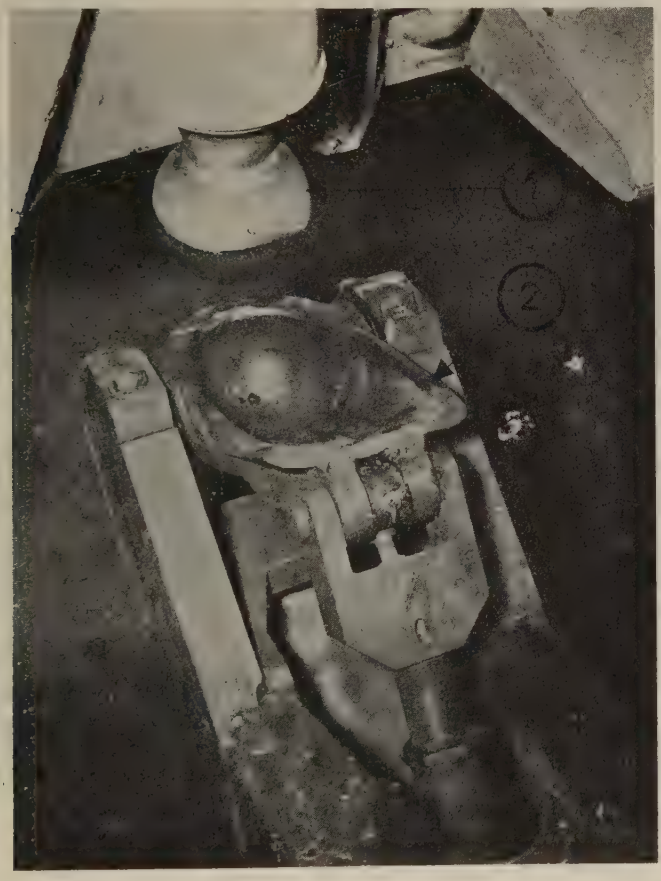


Fig. 6.

Moreover, in order to facilitate its circulation on the rake of wagons and to keep it strictly centered, the tractor is fitted with the same cross stays as the semi-trailers but these are designed in such a way that they do not take the place of the rear wheels but merely take the load off them to some extent; the remaining adhesion is sufficient for the necessary effort.

V. Loading gauge.

The admissible loading gauge for the « Kangaroo » semi-trailers is shown in Plate D. It should be noted that the great majority of the existing semi-trailers fit within this gauge.

VI. Loading practice.

Special mobile loading ramps are used (Plate E).

The wagons with drawbridge raised allow free access to the unit tractor + semi-trailer over the rake until they arrive on the wagon with drawbridge lowered which is to carry the semi-trailer.

Loading takes place from the end of the wagon, in general by means of a mobile ramp. In a few special cases, use is made of a fixed ramp which, however, has the same characteristics as the mobile ramp.

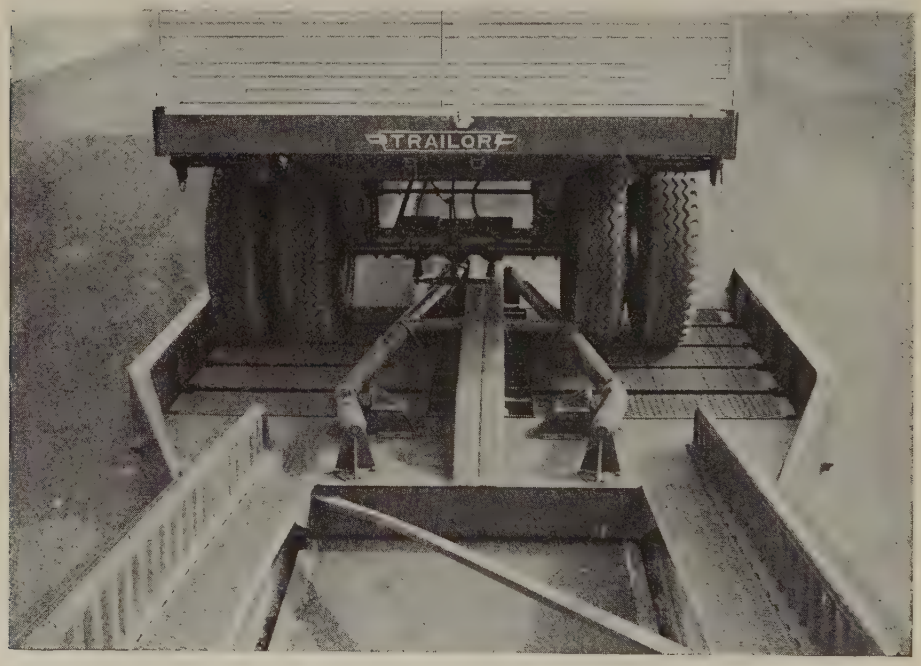


Fig. 7.

To bring the special cross stays onto the guide rails without any damage to the pneumatic tyres, a centering device has been designed; this consists essentially (fig. 7):

— of a series of movable plates allowing of the transversal displacement of the axles of the road vehicle;

— of rollers arranged in the form of a V intended to centre the vehicles on the guide rails; if the vehicle is out of centre, the walls of the inner pneumatic tyres come into contact with the rollers which push them till they return to the centre; as a result of the movement due to the longitudinal and transversal displacement, the rollers turn when they come into contact with the pneumatic tyres without any harmful rubbing.

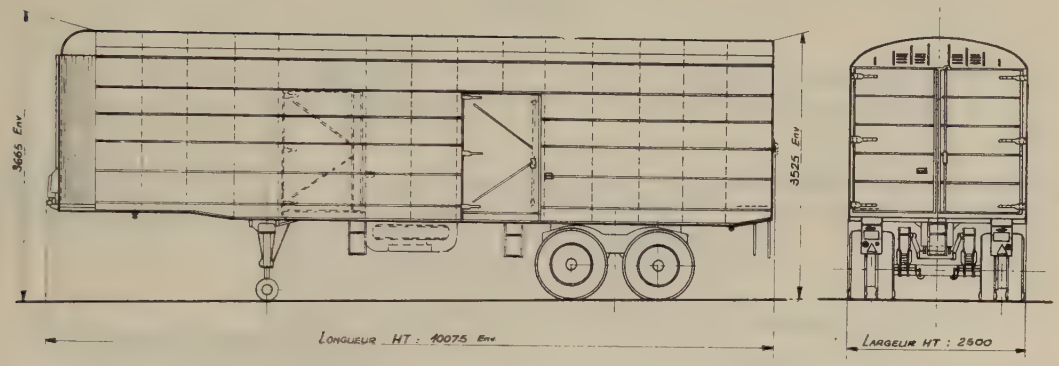
This device can be mounted either on an end platform or on a mobile loading ramp.

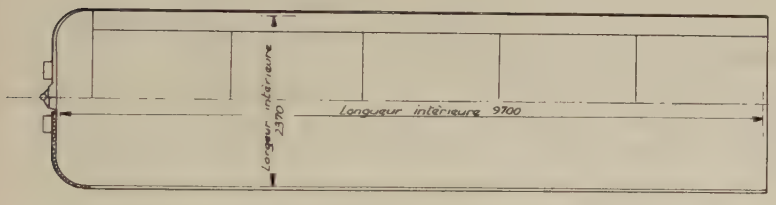
The rail-road depots require, for each train, a straight section of track, part of which must be in a dock so that the mobile ramp can be put into position or removed.

The principle of the loading and unloading operations is shown in Plate F.

APPENDIX II — 8.

PLATE A.





« Kangaroo » semi-trailer van.

Characteristics :

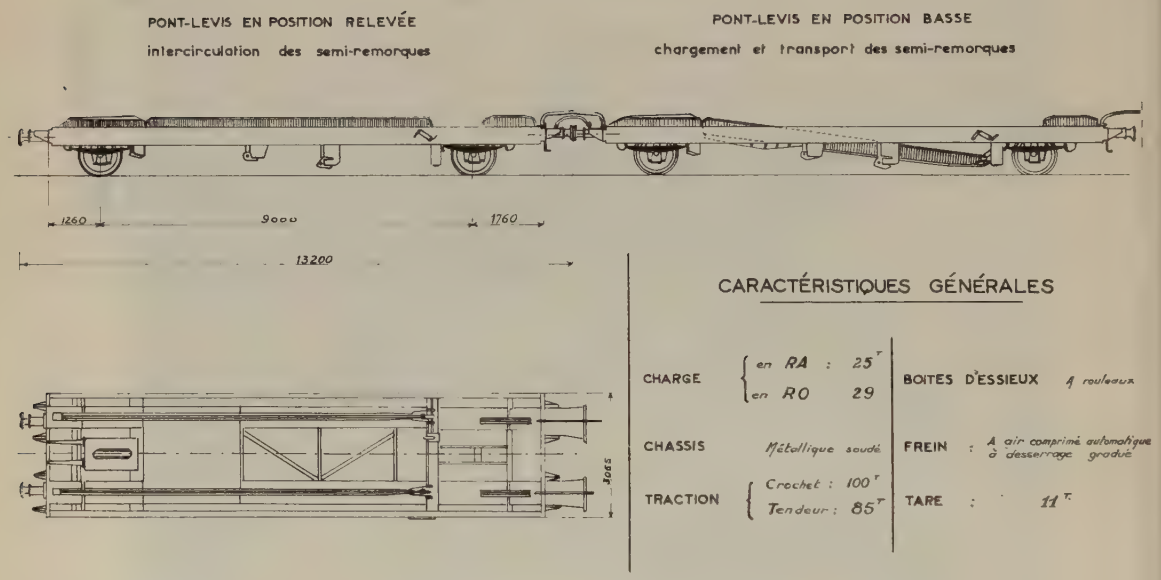
Tare	6 t	P.T.C. maximum	29 t
Maximum useful load	23 t	Useful cubic capacity, maximum.	53.5 m³

Explanation of French wording :

Longueur intérieure : 9 700 = inside length : 9 700. — Largeur intérieure : 2 370 = inside width : 2 370.

APPENDIX II — 8.

PLATE B.



CARACTÉRISTIQUES GÉNÉRALES

CHARGE	en RA : 25 T en RO 29	BOITES D'ESSIEUX	4 rouleaux
CHASSIS	Métallique soudé	FREIN	A air comprimé automatique à desserrage gradué
TRACTION	Crochet : 100 T Tendeur : 85 T	TARE	11 T

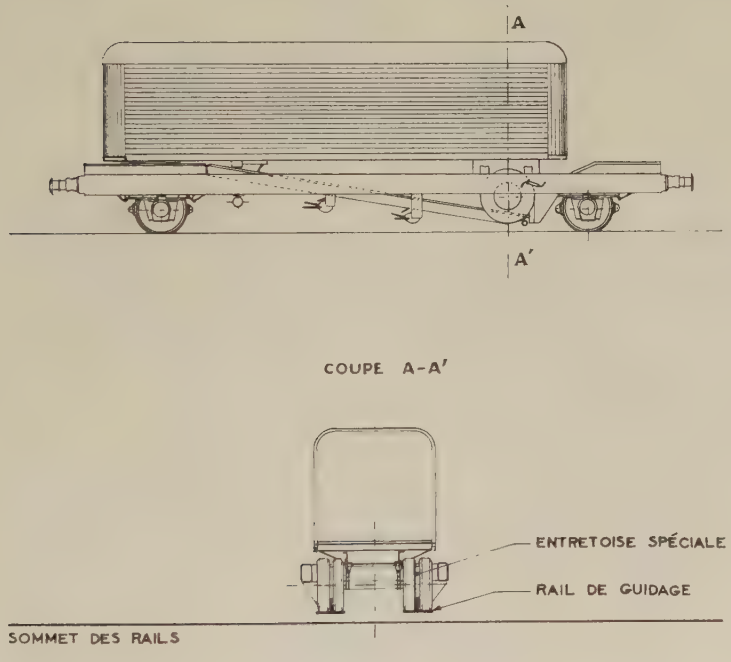
Explanation of French wording :

Pont-levis en position relevée (intercirculation des semi-remorques) = drawbridge raised (intercirculation of semi-trailers). — Pont-levis en position basse (chargement et transport des semi-remorques) = drawbridge lowered (loading and transport of semi-trailers). — Caractéristiques générales = general characteristics. — Charge = load. — Châssis (métallique soudé) = frame (welded metal). — Traction (crochet : 100 t; tendeur : 85 t) = traction (drawbar : 100 t; hook : 85 t). — Boîtes d'essieux (4 rouleaux) = axle boxes (4 roller bearings). — Frein (à air comprimé automatique, à desserrage gradué) = brake (automatic compressed air, graduated release). — Tare : 11 t = tare 11 t).

APPENDIX II — 8.

PLATE C.

Diagram showing the principle of transporting a semi-trailer guided onto a « Kangaroo » wagon.



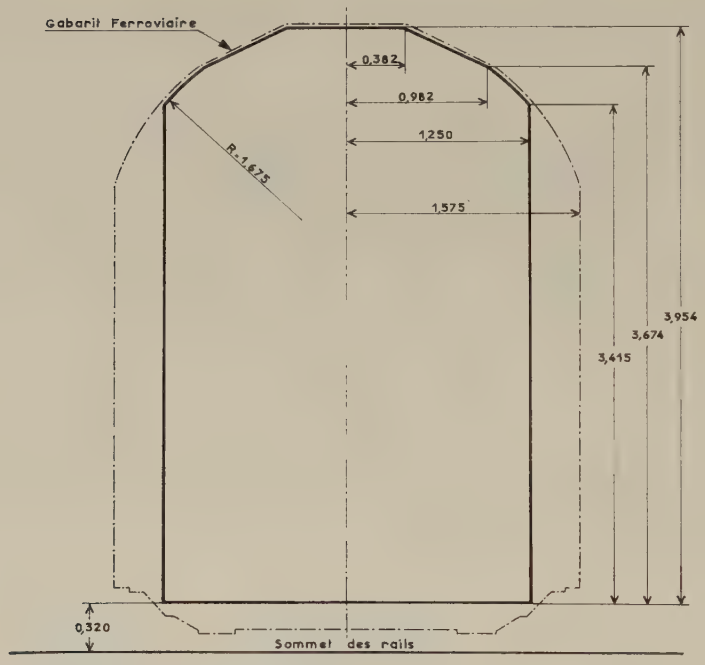
Explanation of French wording :

Coupe A-A′ = A-A′ section. — Entretoise spéciale = special cross stay. — Rail de guidage = guide rail. — Sommet des rails = rail level.

APPENDIX II — 8.

PLATE D.

Maximum admissible loading gauge for semi-trailers carried on « Kangaroo » wagon.



Nota. — The distance from the rails is given for a wagon with 4 t load.

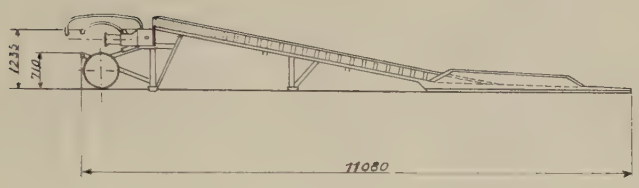
Explanation of French wording :

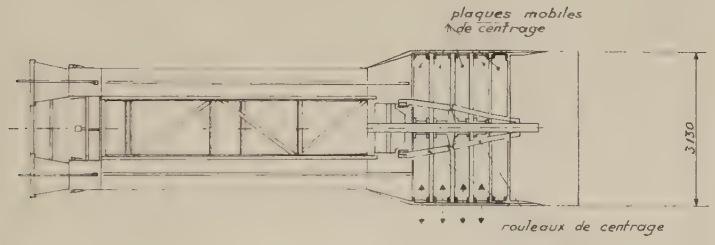
Gabarit ferroviaire = railway loading gauge. — Sommet des rails = top of the rails.

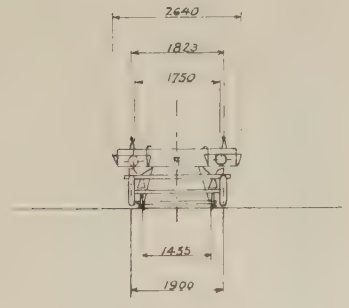
APPENDIX II — 8.

PLATE E.

Mobile loading ramp for loading semi-trailers on « Kangaroo » wagons.







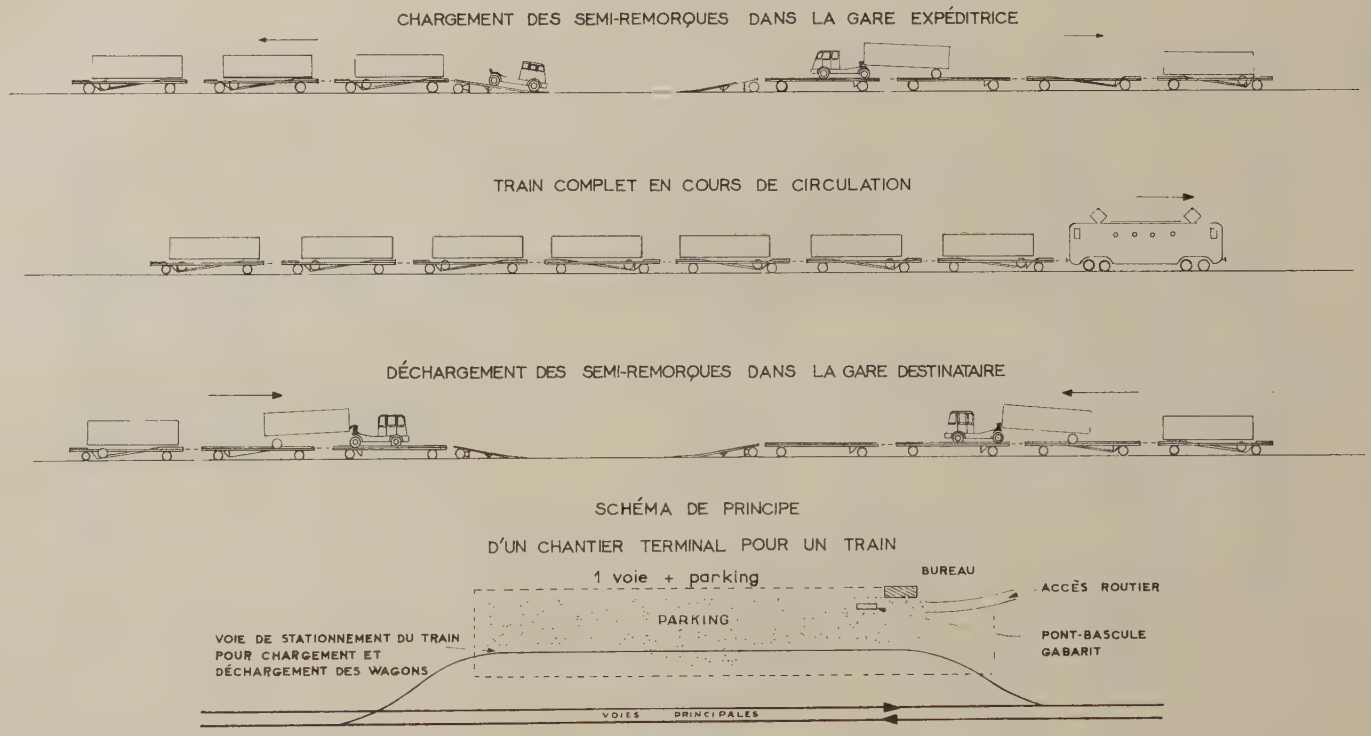
Tare : 5.6 t.

Explanation of French wording :

Plaques mobiles de centrage = movable centering plates. — Rouleaux de centrage = centering rollers.

PLATE F.

Working a train composed of « Kangaroo » wagons for the transport of semi-trailers.


CHARGEMENT DES SEMI-REMORQUES DANS LA GARE EXPÉDITRICE
TRAIN COMPLET EN COURS DE CIRCULATION
DÉCHARGEMENT DES SEMI-REMORQUES DANS LA GARE DESTINATAIRE
SCHÉMA DE PRINCIPE
D'UN CHANTIER TERMINAL POUR UN TRAIN
1 voie + parking
BUREAU
ACCÈS ROUTIER
PARKING
VOIE DE STATIONNEMENT DU TRAIN POUR CHARGEMENT ET DÉCHARGEMENT DES WAGONS
PONT-BASCULE
GABARIT
VOIES PRINCIPALES

Explanation of French wording :

Chargement des semi-remorques dans la gare expéditrice = loading the semi-trailers in the consigning station. — Train complet en cours de circulation = complete train during the run. — Déchargement des semi-remorques dans la gare destinataire = unloading the semi-trailers in the destination station. — Schéma de principe d'un chantier terminal pour un train = diagram showing the principle of a terminal depot. — 1 voie + parking = 1 track + parking space. — Bureau = office. — Accès routier = road access. — Pont-bascule, gabarit = weighbridge, loading gauge. — Voie de stationnement du train pour chargement et déchargement des wagons = siding taking the train during loading and unloading of the wagons.

APPENDIX II — 9.

ITALIAN STATE RAILWAYS.

F.S. PIGGY-BACK SYSTEM.

The F.S. solution, now under study, provides for the transport on a *specially adapted wagon of semi-trailers having special characteristics.*

I. Characteristics of the semi-trailers (Plate A).

The semi-trailers have the following general characteristics :

— overall width	2.400 m
— overall length	8.250 m
— overall height	3.900 m
— number of axles	1

II. Characteristics of the wagons.

The wagons in question have been slightly modified, and their characteristics are shown in Plate B.

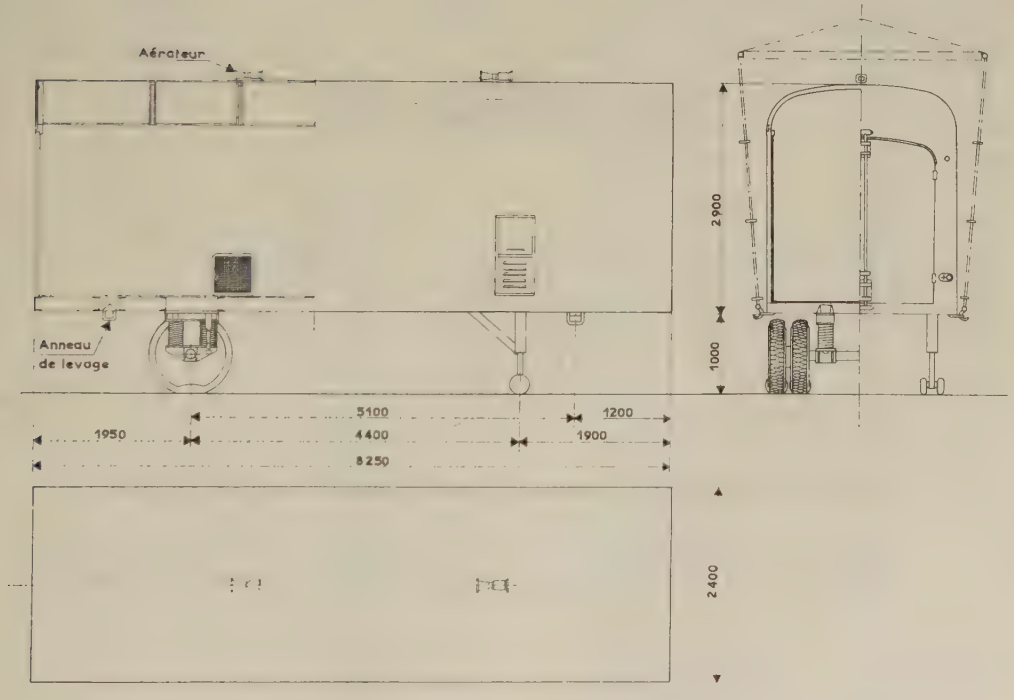
III. Loading practice.

The semi-trailer is brought up to the wagon on which it is then loaded by a gantry crane.

APPENDIX II — 9.

PLATE A.

F.S. Piggy-back system.

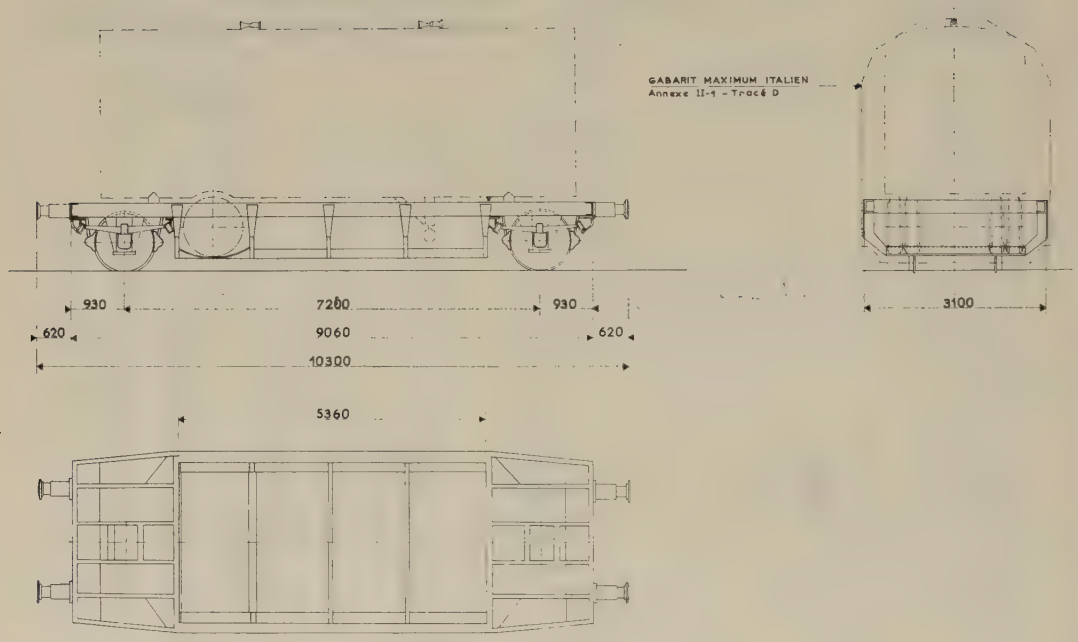


Road semi-trailer specially adapted.
Useful capacity : 55 m³.

APPENDIX II — 9.

PLATE B.

F.S. Piggy-back system.



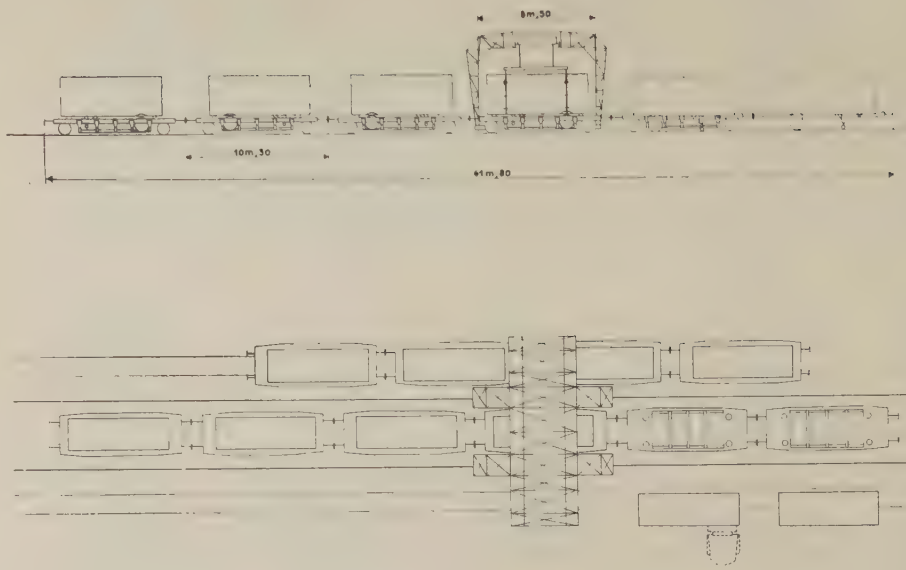
Wagon modified for the transport of specially adapted road semi-trailers.

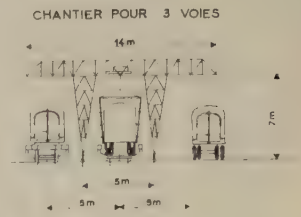
Explanation of the French wording :

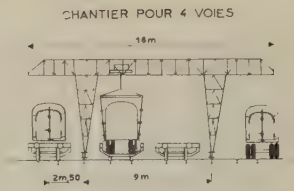
Gabarit maximum italien (annexe II-1, tracéD) = maximum Italian loading gauge (Appendix II-1, outline D).

PLATE C.

F.S. Piggy-back system.







RAIL-ROAD DEPOT SHOWING THE OPERATIONS OF LOADING AND UNLOADING THE SEMI-TRAILERS BY MEANS OF A GANTRY CRANE.

Explanation of the French wording :

Chantier pour 3 voies = three track depot. — Chantier pour 4 voies = four track depot.

APPENDIX III — 1.

THE LEGAL POSITION AS REGARDS CARRYING OUT ROAD TRANSPORT BY THE RAILWAY.

In *Austria,* the Federal Railways do not operate any freight services by road apart from the field of their delivery services, their services of transport of trailers carrying wagons and the traffic replacing rail services. This latter can be organised in all cases of urgency, especially if there is any breakdown in the railway services. By « urgency » is understood both temporary interruption of the services and prolonged suspension of the services on a given line.

Competition from road vehicles belonging to the railway or rented by the latter is therefore only possible within the very narrow limits indicated above.

In *Belgium,* the S.N.C.B. can only carry out the terminal delivery services by road. Such services are assured either by lorries belonging to the railway, or by means of lorries that have been hired together with their drivers.

Delivery services worked under contract are gradually disappearing.

In *France,* according to the terms of its specifications the S.N.C.F. :

— is allowed (article 20) to carry out or arrange for the carrying out of the collection and delivery services (haulage) in all localities; such services are even obligatory in all towns of more than 5 000 inhabitants, situated less than 5 km from a station;

— may be authorised (article 8) by the Ministry of Public Works and Transport to carry out or have carried out the services on a line or section of line by some other method of transport than rail and by another route (substitution).

In practice, in both cases, the S.N.C.F. entrusts such operations to firms with which it has made a contract.

In the case of the haulage services, the intermediary is an affiliated company in Paris (the S.C.E.T.A.) corresponding undertakings in which this affiliated company has shares in certain large towns, and private firms in less important localities.

The substitute services are entrusted to road undertakings who act as carrier for the S.N.C.F.

At the present time, such substitute services cover a total mileage of more than 2 300 km of lines. In addition, on certain lines (Paris-Lyons artery, suburbs of Lyons and Lille and Chartres district), parcels and small packages are sent by road, the railway still carrying full wagon loads and through parcels trains.

Finally, in the same order of ideas, the S.N.C.F. has made an experiment : the chartering of long distance road firms (long zone) through S.C.E.T.A. At the present time, this organisation only concerns a limited number of road vehicles.

It thus appears that in practice the road vehicles which are carried by wagon in no case belong to the S.N.C.F.

In *Switzerland,* the Federal Railways do not carry out any transport of freight in their own road vehicles. In principle, they do not work any road transport parallel to the railway. They only assure the terminal delivery services by means of the official haulier who has his own lorries.

In the *Mali Federation,* the Mali Railways do not carry out any road transport of freight in vehicles belonging to them. On the other hand, they have made agreements for through rail-road traffic with road firms in the case of the following services :

Saint-Louis-Aim Ben Tilit via Rosso, Nouackchott, Akjoujt, Atar, Fort Gouraud and Fort Trinquet	1 766 km
Saint-Louis-Boutilimit via Rosso, and Mederdra	280 km
Saint-Louis-Tidjikja via Boghe, Aleg and Moudjera	850 km
Linguere-Kaedi via Matam . . .	315 km
Kayes-Tamchakett via Kiffa . .	420 km
Kayes-Aioun el Atrouss via Yelimane	430 km
Kayes-Nema via Nioro and Timbedra	605 km
Bamako-Gao via Segou and Mopti	1 263 km
Bamako-Bobo-Dioulasso via Sikasso	553 km
Total	6 482 km

In *Italy*, the F.S. do not carry out any transport of freight in lorries owned by them. The door to door transport services or services over given runs are carried out by the National Transport Institute (set up by the F.S.) or by private firms.

The door to door transport services include the transport of full wagon loads and small consignments of goods.

The National Transport Institute (I.N.T.) deals with the haulage services for the parcels traffic, generally making use of sub-contractors (F.S.-I.N.T. delegates) which, some 460 in number, operate in the most important centres. The function of the I.N.T. in Italy, in the field of door to door transport, does not differ from that of similar companies in France, Holland and Switzerland, etc. Delivering full wagon loads home by means of trailers carrying wagons is currently done at 204 stations by the I.N.T. or by firms who have signed a contract with the F.S. A lorry service entrusted to the I.N.T. is now working as an experiment on a few lines with little traffic to deal with the parcels traffic, in order to ascertain to what point road services are preferable to railway services.

In *Czechoslovakia*, there is a definite allocation of vehicles. For this reason the Czechoslovakian State Railways have no road vehicles.

Road transport is assured exclusively either by the public transport undertakings or by various firms carrying out transport on their own behalf. Combined rail-road services are in existence in the case of parcels traffic.

APPENDIX III — 2.

REGULATIONS AND FISCAL REGIME APPLICABLE TO ROAD TRANSPORT.

In *Austria*, there is a tax in the case of long distance road transport calculated according to the number of runs made and the useful load of the road vehicle used.

By run in the case of long distance freight traffic is meant all transport of goods over distances exceeding 65 km, measured as the crow flies from the centre of the locality where the haulier lives. If the authorised representative of the haulier is himself liable to a transport tax, the distance must be calculated from the centre of the locality in which this representative lives, to the extent that the transport is carried out wholly by lorry. In the case of large centres, the Federal Ministry of Finance can fix as a function of the extent of the locality several points from which this distance is to be calculated.

In *Belgium*, professional transport of freight by motor vehicles is *legally* dependent upon the previous authorisation of the Road Transport Office (O.T.R.), an organisation forming part of the Ministry of Communications.

The regulations make its obligatory to register as a haulier in the business registry.

Licences are only granted after an enquiry; this takes into consideration in particular the traffic requirements as well as technical progress and the need to assure the safety of the traffic. When granting licences, the O.T.R. must endeavour to give the users the greatest possible facilities as regards transport whilst taking into account the available transport facilities already on offer by the road hauliers of the various regions of the country, and based on the need to avoid duplication.

Licences are issued for a maximum period of 5 years. They are valid either for all kinds of transport, whatever the goods in question, within the territory, or only for certain special materials, for seasonal traffic or regional traffic, for given kinds of goods, or for transport carried out exclusively on behalf of one or several given persons.

The licences are valid solely for the vehicle specified therein, up to its maximum authorised load. They are of six kinds, according to whether they apply to a vehicle whose maximum authorised load :

1) does not exceed 2 000 kg;
2) is between 2 001 and 7 000 kg;
3) is between 7 001 and 10 000 kg;
4) is between 10 001 and 15 000 kg;
5) exceeds 15 000 kg;
6) licence covering the use of a tractor.

International transport is subject to an « international transport licence ».

Bilateral agreements have been concluded with several countries — in particular, France, Germany, Sweden, Austria, etc., regulating the conditions under which such licences are granted.

In the case of traffic in transit, a transport licence is in practice never refused, as Belgium has subscribed in this connection to the « 1949 Agreement in connection with freedom of Geneva ».

Appeals against the decisions of the O.T.R. can be lodged with an Appeal Committee, either by the petitioner if the licence has been refused, or if a licence has been granted, by any person who has reason to complain thereof. The Appeal Committee consists of a chairman and four members.

Transport on ones own behalf does not require any licence.

In the case of transport of freight by lorry, trailer, etc. the *fiscal regime* lays down an *annual traffic* tax of 150 francs per 100 kg of tare (weight of the vehicle) up to 1 000 kg. When the taxable weight exceeds 1 000 kg, the tax per each 100 kg applying to the total taxable weight is 150 francs plus 7 francs per 100 kg over and above 1 000 kg, the tax per 100 kg is in no case to exceed 381 francs.

By weight of the vehicle is to be understood the weight in running order, i.e. with the coachwork, equipment, accessories and full supply of petrol or other fuel, water and lubricating oil, but excluding the persons and goods carried; fractions of 100 kg are included or left out according to whether they are over or less than 50 kg.

Vehicles used for public State, provincial or communal services are exempt from the road tax.

This tax is also affected by :

— *reductions :*

25 % in the case of vehicles whose engine is more than 5 years old;

75 % in the case of transport within the port areas;

2/3rds : in the case of international freight services using vehicles of at least 7 t tare which will only be used in Belgium for not more than 90 days a year;

2/3rd or 11/12th : in the case of goods carried in vehicles used on the public roads not more than 90 days or 12 days respectively during the year;

— *increases :*

+ 20 % in the case of vehicles whose wheels have hollow rubber tyres or semi-pneumatic tyres;

+ 50 % in the case of vehicles whose wheels have solid rubber wheels;

+ 100 % in the case of vehicles having metal tyres;

+ 60 % in the case of vehicles whose engines run, even partially or temporarily, on heavy oil or hydrocarbons derived from paraffin and gases at the usual temperature and pressure.

In the case of foreign vehicles, the regime applying is as follows :

— vehicles of less than 5 t tare : 120 francs per day;

— vehicles of 5 t but under 10 t tare : 180 francs per day;

— vehicles of 10 t tare and over : 370 francs per day;

— an additional 60 % if the vehicle runs on the heavy oil or gas fuels mentioned above.

Luxury tax :

— vehicles for carrying goods . . . 11 %

Transmission tax :

— petrol . . . . . 12 %

— fuel oil . . . . . 10 %

— repairs, maintenance, spares and accessories, pneumatic tyres . . . 5 %

Consumption tax (purchase tax) :

— petrol : 3.20 fr. per litre (3.70 fr. as from the 1st December 1958);

— fuel-oil : 0.30 fr. per litre since the 1st December 1958.

Tax on professional freight transport :

— 5 % on the cost of the transport for the part of the journey in Belgium.

In *France*, the existing regime is as follows :

I. Regulations.

The regulations are fixed by the Decree of the 14th November 1949, concerning the co-ordination and harmonisation of railway and road transport.

Private transport or transport on one's own behalf are exempt, in view of article 23 :

« *Article 23.* — The following are not subject to co-ordination :

» 1) private transport or transport on one's own behalf, i.e. transport carried out for one's own business, by some one having legal status to move, whilst retaining control of the transport, the goods belonging to one or forming part of one's business, industry or undertaking in vehicles belonging to one or at one's sole disposal through hiring, under the conditions laid down in article 41 of the present decree, on condition that the transport is merely an accessory activity compared with the professional activities of the party in question. »

In the case of *public transport,* the principle affecting it is laid down in the first paragraph of article 30 of this decree :

« *Article 30.* — Public road transport of goods other than that dealt with under article 24 can only be carried out by undertakings whose name is included in the special register kept by the department technical committees under the control of the Ministry of Public Works, Transport and Tourism, known as the « Register of public transport undertakings. »

In each department, a register is kept of public transport undertakings which is divided up into three separate sections :

— for the long zone (a long zone permit allows of transport over the whole country within the limits of the maximum loads given);

— for the short zone (a short zone permit authorises all transport within a clearly defined zone which is within a circle of approximately 150 km around the capital of the department; there is a short zone in each department);

— for haulage zones, there is a zone for each urban commune in the department, without, however, the limits of such a zone being more than 40 km around the commune.

In addition, temporary permits or permits for a single run are issued in various ways by the Chief Engineers of the Bridges and Highways Department, in virtue of article 8 of the law of the 15th December 1940.

When co-ordination was first introduced, the road traffic was limited to those vehicles on the roads on the 21st April 1934 and to the services and traffic (kinds of goods) then being carried.

In actual fact, successive regulations have progressively extended the « rights » of the hauliers who are no longer restricted as regards the kinds of goods nor to given runs, but simply to a given field of action.

At the present time :

— are registered in the long zone those undertakings which on the 21st April 1934 (first date of the co-ordination regime) were making runs embracing at least two departments;

— are registered in the short zone all other undertakings which were operating before the 21st April 1934, as well as those which before the 14th November 1949 carried out services within towns (before this date, such traffic was exempt) and which have continued to work such services over the next three years.

The Ministry of Public Works fixed, by a decree dated the 25th May 1959, an additional quota of 35 000 t for the long zone and at the present time is endeavouring to do away with quarterly licences or permits for runs (issued for long zone runs to short zone hauliers).

II. Fiscal regime.

A. *Taxes on road vehicles.*

As regards the transport of freight, the financial law of the 4th August 1956 introduced the following taxes :

1) *a general tax* on motor vehicles whose total authorised weight loaded exceeds 3 t and on trailers whose total authorised weight loaded exceeds 750 kg;

— *Half-yearly rate of the general tax* (motor vehicle or trailers) :

20 N F per tonne for vehicles in private transport;

25 N F per tonne for public transport vehicles.

(The tax is reduced by 30 % in the case of semi-trailers.)

There is a *daily rate* of the general tax for foreign vehicles coming into France : 0.80 N F for a private vehicle, and 1 N F for a public vehicle;

2) *a surtax* on all the vehicles and sets of motor vehicles whose maximum authorised weight loaded exceeds 6 t, which work outside the short zone.

The surtax can be paid per day working outside the short zone :

— *Half-yearly rate of surtax* (motor vehicles, trailers or semi-trailers) :

75 N F per tonne over and above 6 t total weight for private vehicles and public transport vehicles belonging to a member of a public road transport association (general case);

100 N F in the case of vehicles belonging to public transport firms which do not belong to any professional association (exception).

— *Daily rate of surtax : 1.50 and 2 N F* respectively.

B. *Tax on fuel consumption.*

In France, these are what are known as « interior taxes ». Under the heading of the specific costs of road transport, should be included the amounts of the interior taxes, less any common law tax which should be imposed. At the present time (June 1959) :

Kind of fuel	*Amount of interior tax per litre*	*Common law tax*	*Specific charges per litre*
	NF	NF	NF
Petrol	0.679	0.0175	0.661
Special petrol	0.699	0.0175	0.681
Fuel oil	0.401	0.017	0.684

Nota. — N F = new French francs.

The amount of the interior taxes on lubricating oils corresponds approximately to the common law tax.

There is a common lax tax on pneumatic tyres.

III. Other specific dues.

Negligible.

In the *Mali Federation,* the position is as follows :

A. *Legal regime :*

The existing regime is complete liberty, with the reservation however in the case of the majority of public transport undertakings that a transport permit must be obtained from the competent Ministry in each territory :

a) public passenger or freight transport within the limits given below always requires previous authorisation, which is obtained from the competent Ministry of the territory concerned on the advice of the Consultative Transport Committee of the territory;

b) private transport is not subject to any regulation, as the declarations which formerly had to be made are no longer required.

No transport permit is required in the case of :

— taxis;

— occasional services run for tourists, excursions, or pilgrimages;

— post office transport;

— vehicles having a load capacity not exceeding 2 000 kg;

— vehicles which only run within a town or city or within a radius of not more than 20 km around it.

On the other hand, if a private vehicle takes on additional freight or a return load which does not belong to the owner, this takes away its private character; it is then considered as public transport.

The main objects of the measures adopted in the case of public transport are :

a) to limit the number and tonnage of the vehicles. The object was to crystalise the position without however causing paralysis, since in addition to the vehicles already in service before the regulations were issued, others can be granted permits to serve places whose transport facilities are non-existent or inadequate, for the creation of new services or the extension of existing services meeting new economic needs;

b) to profit by this pause to restore order to road transport and draw up a transport plan.

However, the Governments of the Mali Territories are at the present time in full political and economic evolution; in certain territories, study committees have been set up to study these questions of rail-road competition or co-operation.

B. *Fiscal regime :*

a) On entering Senegal, every motor vehicle has to pay : an entry tax which varies according to the value of the vehicle, and a fixed tax of 15.37 %.

These two taxes represent about 39.50 % of the purchase price of the vehicle;

b) for the purpose of the road fund, every vehicle pays 6 francs per litre of fuel purchased;

c) for local taxes, each vehicle pays 5 francs per litre of fuel purchased. At Dakar, the price of petrol is at the present time 34.20 fr.;

d) each year, each vehicle less than 10 years old pays a tax known as « Tax on motor vehicles and velocipedes ». This varies between 2 000 and 5 000 francs according to the power of the vehicle;

e) finally, public road transport undertakings pay each year the amount stipulated in their permits.

In the territories, which the *Abidjan-Niger Railway* runs through, the regulations are as follows :

1) transport on one's own behalf is freely carried out in vehicles belonging to the owners of the goods carried. No controls are made;

2) public transports are carried out by means of the vehicles of the hauliers or transport undertakings already in existence. The renewal of the stock of vehicles is authorised under permit, but increasing the number of vehicles can only be done on proof of new economic need; no new transport undertakings can be allowed unless new economic needs are created justifying such new undertakings. These regulations were laid down in the general decree No. 8467 of the 15th October 1958.

These restrictions on numbers are controlled by the issue of transport permits. A permit is issued on a simple declaration for each vehicle allowed to operate under the above conditions. These permits are permanent.

There are also temporary permits, valid for a single run in the case of transport of an exceptional nature owing to the kind of freight which involves the use of special stock.

The regulations are concerned with keeping at a predetermined value the transport capacity of the authorised numbers of vehicles.

The measures indicated above apply to the whole of the territories and do not depend upon the distances run nor the zone of action of the vehicle.

The weight of the vehicle loaded must not exceed 9.5 t per axle on all the routes followed; however, vehicles on the *Abidjan-Bouake* run, where the places at each end of the run are served by a railway which connects them directly must not have a useful load of more than 6 t.

The above measures also apply in the case of hired vehicles when they are hired for periods of more than three months.

The transport permit is a document (blue card) kept by the driver of the licensed vehicle. This card gives the number of the transport undertakings authorisation, place and

date of payment, the period of validity of the assurance covering the vehicle, the dates of inspections carried out by the Veritas Office, the routes authorised, the number of the vehicle, the weights, empty, fully loaded, the weight of the load and finally the name of the owner.

Controls are carried out by the « Gendarmerie », the « Police » and the sworn in employees.

Penalty for the first infringement of the law is a fine of 2 600 to 6 000 francs, a second offence carries a term of 15 days imprisonment and a third offence the forfeiture of the vehicle and the bringing up of its owner before the Tribunal.

The Government which formerly was very tolerant, is now trying to carry out more effective control and prove its firmness; on their side also, the professional hauliers are in favour of strict control in their own interests in order to eliminate pirate undertakings.

In *Switzerland,* the fiscal regime applicable to road transport is a matter for the Cantons, not the Federation, i.e. there are 25 different legislations, the taxes and categories of vehicles differing from canton to canton. The highest taxes are those imposed in the Canton of Vaud, where they are 930 francs per vehicle, whilst the average for the Swiss Cantons is 638 francs and the lowest rate is in Basle-Town where the average tax is 270 francs per vehicle.

[656 .23 (73)]

Special features of American tariffing,

by Dr. Gustave Lowe, Manager Rates.

Kaiser Aluminium & Chemical Co., Oakland (California.)

(*Verkehr*, No. 2, 11 January 1958.)

The structure of American tariffs is, in general, similar to that of European tariffs. The classification of freight, distance tables, scales, exceptional rates, etc. are all like their European counterparts. We describe below a few special features of American railway tariffs which do not find any parallel in European tariffs.

Publication of the tariffs.

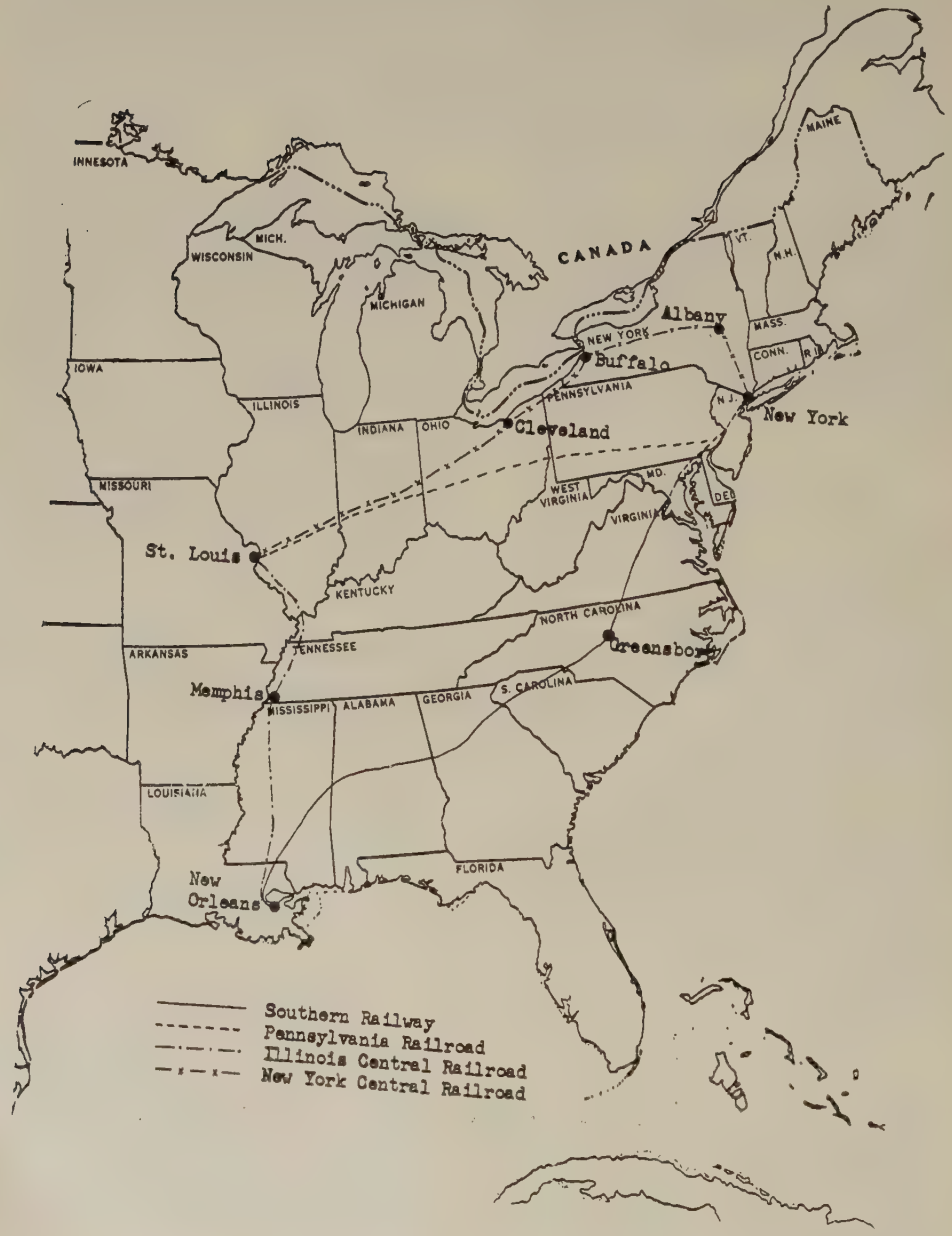
Modifications in the transport charges and the classification of freight, whether it is question of an increase or reduction, are subject to a publication delay of 30 days. All new tariffs or supplements have to be advised to the higher authorities, the « Interstate Commerce Commission », which alone has a complete collection of all the tariffs in the United States. If any interested party lodges a protest within 18 days of publication, the Commission may postpone the coming into force of the tariff or supplement for seven months, in order to investigate in the meantime whether the published rate is contrary to the law. Regular consignors are issued with particulars of the tariffs and supplements free of charge.

« Transcontinental » tariffs.

Originally each of the numerous American railways had its own tariffs. It took a century for the trend towards unification to be completed. The « transcontinental » tariffs differ essentially by their constitution from the other tariffs. In the « Far West », with its irregularly distributed population and production, concentrated at a small number of points, distance is only secondary. Instead of a scale, fixed prices are usually the rule. In the « Transcontinental » traffic between the Far West on the one hand and the rest of the United States on the other, there are special tariffs, some of them 1 500 pages thick, which give all the transport charges between the large regions. The western group consists, in general, of California, Arizona, Nevada, Oregon and the State of Washington; the north-east including Virginia, Western Virginia, Pennsylvania, New York and New England, is one of the eastern regions. The same transport rates apply between all the stations of the western group on the one hand and those of the eastern group on the other. From Fairmont (Western Virginia) to Wells (Nevada), a distance of 2 117 miles (3 406 km), the same rates apply as between Bangor (Maine) and Eureka (California), which are 3 662 miles (5 392 km) apart. These distances are by the shortest routes; the same transport rates also apply on the roundabout route which may be 500 (805 km) or even 1 000 miles (1 610 km) longer.

« Intermediate application. »

Chapter IV of the « Interstate Commerce Act » states that it is illegal to charge a higher rate to an intermediate station than the rate to a station lying beyond it. As the drawing attached shows, Greensboro (Northen Carolina) is an intermediate station between New-Orleans (Louisiana) and New York by the direct and shortest


INNESOTA
WISCONSIN
MICH.
MICHIGAN
CANADA
MAINE
VT.
N.H.
Albany
NEW YORK
MASS.
CONN.
R.I.
Buffalo
IOWA
ILLINOIS
PENNSYLVANIA
N.J.
New York
INDIANA
OHIO
Cleveland
MISSOURI
WEST VIRGINIA
MD.
DEL.
VIRGINIA
St. Louis
KENTUCKY
NORTH CAROLINA
Greensboro
ARKANSAS
TENNESSEE
Memphis
MISSISSIPPI
ALABAMA
GEORGIA
S. CAROLINA
LOUISIANA
FLORIDA
New Orleans
Southern Railway
Pennsylvania Railroad
Illinois Central Railroad
New York Central Railroad

route over the lines of the « Southern Railroad » and « Pennsylvania Railroad ». The cost of transport from New-Orleans to Greensboro must not, in general, exceed that of transport from New-Orleans to New York which is the subject of competition from navigation; the internal stations, such as Greensboro which do not profit by such competition are however protected by Chapter IV. The « Interstate Commerce Commission » may in certain circumstances authorise exceptions.

Transport from New-Orleans to New York can follow different routes. The drawing shows one of the longest of these routes, via the Illinois Central Railroad as far as Saint-Louis (Missouri) and thence via the New York Central System to New York. The towns of Memphis (Tennessee), Saint-Louis (Missouri), Cleveland (Ohio), and Albany (New York) lie on this route. The reduced rate from New-Orleans to New York therefore must also be granted to consignments to these intermediate stations. The same rule applies to the consigning stations : the transport rates from New York to New-Orleans must not be higher than those from Albany to New-Orleans or Memphis.

Order Bill of Lading. Diversion and reconsignment.

The « Order Bill of Lading » is an ancient American practice and even today it does not seem possible to do without the corresponding yellow waybills. The Order Bill of Lading allows goods to be sold during transport, which in the case of runs of several thousand miles may sometimes take two weeks or longer. The American waybill differs from its European counterpart in that, amongst other things, it is kept by the consignor, duplicates are unknown, and the goods are accompanied by a waybill document drawn up by the consigning railway which is kept by the destination railway.

The consignor has the right to modify considerably the transport contract during the run if no Order Bill of Lading has been drawn up. The destination station, the consignee, the route, etc. can all be changed merely by telephoning the consigning railway or the intermediate railway if the consignor is known to them. This practice is of great importance for the trader in vegetables, fruit or cereals who has, for example, a wagonload of peaches en route to Chicago and learns that considerable quantities of this fruit are on sale in that city. Without having to present the waybill, he can have the wagon redirected to New York and possibly the next day, to Philadelphia or Boston, in accordance with the changes in market conditions.

Most of the large railway companies have buying and transport agencies in the important centres who are kept informed of the running of the wagons. The recent electronic telegraphic installations of the Chicago Rock Island or of the Chesapeake & Ohio Railroad automatically report the arrival and departure of each wagon from the shunting stations to all the agencies concerned. This special service enables the consignor of perishable goods to take them to the best market and consequently is excellent publicity for the railway. The transport rates over the different routes are the same, only the services rendered differ.

Partial loading and unloading.

The consignor has the right to complete a load during the run or to unload part of his goods. A shop in San Francisco for example orders a part consignment from New York and another from Philadelphia. The New York consignor loads his order and sends the wagon forward with orders to stop at Philadelphia on a given private sinding to pick up the rest of the load. During the additional loading at Philadelphia, the railway is free of all responsibility; the rate is calculated for the complete load from the original consigning place to the destination station; a supplement is charged for the part load.

Likewise a metallurgist in Pittsburg (Pennsylvania) may, for example, dispatch a wagon containing goods for different consignees at Salt Lake City (Utah), Reno (Nevada) and Los Angeles (California). The goods are loaded separately into the wagon, the waybill contains the necessary particulars, and the railway consequently first of all puts the wagon at the disposal of the part consignee at Salt Lake City who unloads his goods; the wagon is then sent on to the second consignee at Reno, and finally to Los Angeles. The railway is not responsible for the part unloading nor for any damage which occurs during handling.

Milling or Fabrication in transit. Pallets.

This special American tariff originally applied to transports of cereals and flour; the transport of cereals to the mill and of the milled products from the mill to the market were considered as being an uninterrupted transport and through rates were charged for the flour from the original consignment place of the grain to the market where the flour was to be sold. This system has been applied to other goods and has become an important method of obtaining traffic for the railway in competition with motor traffic and inland navigation. Iron and steel, for example, can undergo various treatments « in transit » without loosing the benefit of the through rates.

After much resistance, the American Railways have recently authorised, as a trial, that the weight of pallets be considered as a tare and deducted from the weight on which the rates are charged. The motor industry has followed this example with some hesitation, although costings studies have shown that the speeding up of the loading and unloading, as well as savings in compensation paid for damage more than cover the loss in receipts.

Résumé.

It may be that one or other of these special American tariffs will be imitated by European transporters. However, important fields of European transport are unkown in the United States, so that on the average things are about equal.

NEW BOOKS AND PUBLICATIONS.

[385 (02]

Directory of Railway Officials and Year Book, 1959-1960. London : Tothill Press Ltd., 33, Tothill Street, Westminster, S.W.1. — One volume of 616 pages (8 1/2 × 5 1/2 inches). (Price : 60 sh. net.)

The Directory of Railway Officials and Year Book, 1959-1960, reaches with the present volume its 65th year of publication.

The first edition was compiled from official sources in 1895. The present edition containing 616 pages of text includes the general index and the personal index to railway officials, a noteworthy feature of the volume.

A new feature is a section giving details of suppliers of signalling and interlocking equipment throughout the world. These are grouped first under the countries in which the offices and works are situated, with brief indication of their products; and in a further section suppliers are grouped under the type of product.

The entries for the British Transport Commission and the different Regions of British Railways have been revised.

The list of principal electrically operated railways has been further amplified.

All other features have also been revised to date but have not needed drastic overhaul.

This edition should prove as valuable as its predecessors. It will be greatly appreciated by all those concerned with railway matters.

A. U.

[385 (09 (599)]

Reconstruction du Chemin de fer Trans-Vietnam *(Reconstruction of the Trans-Vietnam railway).* — A pamphlet (10 5/8 × 10 5/8 inches) of 26 pages with two maps and numerous illustrations — 1959, Saïgon, published by the *Viet-Nam Railway Administration.*

In a pamphlet published in August 1959, on the occasion of the completed reconstruction, south of the 17th parallel of the Trans-Vietnam Railway, the Viet-Nam Railway Administration relates the history of the construction, completed in 1936, of the railway which links up Saigon and Hanoi over a distance of 1 740 km, its vicissitudes during the second world war and during the long period of guerilla warfare, which followed this in Viet-Nam, and the various phases of its reconstruction since 1954.

The energy with which the latter work has been carried out and the way in which the railway as flourished since the services have been restored, both as regards passenger traffic and freight traffic, makes it possible to forecast a prosperous development of this artery, so vital for the economic life of Viet-Nam, a development which will contribute towards the economic growth of the extensive inner regions of the country in which it is already planned to develop important industrial undertakings.

R. S.

[385 (061 .5]

A change of President for the Office for Research and Experiments of the International Union of Railways.

The Office for Research and Experiments (O.R.E.) of the International Union of Railways (U.I.C.) informs us that in future it will be presided over by Mr. J. P. KOSTER, Engineer, General Manager of the Netherlands Railways, who succeeds the former President of O.R.E.; Doctor F. Q. DEN HOLLANDER, who has now retired as he did previously from the general management of the Netherlands Railways on the 1st January 1959.

Mr. DEN HOLLANDER was amongst the founders of O.R.E. in 1949; from the beginning, as President of the Office, he was concerned with its establishment and development. The results of the work carried out by O.R.E. under his leadership have already had a very marked influence upon European railway technique. We wish his successor every success.

It may be remembered that O.R.E. was set up by a decision of the Management Committee of U.I.C. in December 1949, in order to increase and co-ordinate the efforts of the various Railway Administrations belonging to U.I.C. in the field of technical research. The main object being to lead progressively to as complete a pooling as possible of the researches and trials carried out by the European railways in order to obtain with the same financial outlay a more general application and greater progress in railway technique than would be possible by the isolated activities of the various Administrations.

O.R.E. is in fact an international study office which, when it has completed its researches and trials, submits for the approval of the Administrations the conclusions arrived at, which are generally of a technical nature, but also may include factors of an economic kind.

In carrying out its studies, O.R.E. calls upon the services of a body of engineers belonging to the various Administrations who work upon the international plane, thus grouping together the most qualified experts on each particular subject. At times, it also calls upon experts from outside the railway. In other cases, it establishes contacts with Industry.

MONTHLY BIBLIOGRAPHY OF RAILWAYS[1]

PUBLISHED UNDER THE SUPERVISION OF

P. GHILAIN,

General Secretary of the Permanent Commission of the International Railway Congress Association.

(FEBRUARY 1960)

[**016** .385 (02]

I. — BOOKS.

In French.

1959 **621** .392

SEFERIAN (D.).

Métallurgie de la soudure.

Paris, Dunod, éditeur, 92, rue Bonaparte. Un volume relié de 400 pages (16 × 25 cm), avec 333 figures. (Prix : 5 800 fr. fr.)

1959 **621** .431

SERRUYS.

Traité de machines à combustion interne. Tome I : *Thermodynamique.*

Paris, Dunod, éditeur. Un volume relié de 268 pages (16 × 25 cm), avec 28 figures et 6 planches hors texte. (Prix : 3 800 fr. fr.)

1959 **313** .385

UNION INTERNATIONALE DES CHEMINS DE FER (U.I.C.).

Statistique Internationale des Chemins de fer. Année 1958.

Paris, Secrétariat Général de l'U.I.C., 10, rue de Prony. Un volume (24 × 31 cm) de 166 pages, avec de nombreux tableaux.

1959 **721** (03

VAN MANSUM (C.J.).

Dictionnaire du bâtiment et des travaux publics. (Anglais-américain, français, allemand et hollandais.).

Paris, Dunod, éditeur, 92, rue Bonaparte. Un volume relié (16 × 23 cm) de 500 pages. (Prix : 6 400 fr. fr.)

In German.

1959 **656** .211

FAKINER (F.).

Der moderne Personenbahnhof in Technik und Betriebsweise.

Mainz und Heidelberg, Verlagsanstalt Hüthig & Dreyer, G.m.b.H. 62 Seiten und 51 Abbildungen auf Kunstdruckpapier. (Preis, broschiert : DM 4.80.)

1959 **624**

KESTERN (C.) & TRAMITZ (W.).

Der Stahlhochbau. *Band II.* 6. Ausgabe.

Berlin-Wilmersdorf, Verlag Wilhelm Ernst und Sohn. Ein Band (14,5 × 21 cm) von 278 Seiten mit 567 Abbildungen. (Preis : DM 24.—.)

1959 **62** (01

Prof. Dr.-Ing. P. RIEBENSAHM & Dipl.-Ing. P.W. SCHMIDT.

Werkstoffprüfung. Metalle. 5. *Auflage.*

Berlin-Göttingen-Heidelberg, Springer-Verlag. 62 Seiten, 145 Abbildungen, Gr.-8°. (Preis : DM 3.60.)

1959 **656** .23

SCHEELE (E.).

Tarifpolitik und Standortstruktur. *Band* 13.

Göttingen, Verlag Vandenhoeck & Ruprecht. 235 Seiten. (Preis, broschiert : DM 22.—; Leinw. : DM 25.—.)

In English.

1959 **656** .2

ALLEN (Cecil J.).

Modern Railways. Their engineering, equipment and operation.

London : Faber and Faber, 24, Russell Square, W.C. 1. (Price : 45 s.)

1959 **385** (09 (42)

HAMILTON ELLIS (C.).

British Railway History — 1877-1947.

London : George Allen and Unwin, Ltd., 40 Museum Street, W.C. 1. (Price : 35 s.)

1959 **625** .13

HAMMOND (R.).

Tunnel Engineering.

London : Heywood and Company Ltd., Carlton House, Great Queen Street. (Price : 55 s.)

---

(1) The numbers placed over the title of each book are those of the decimal classification proposed by the Railway Congress conjointly with the Office Bibliographique International, of Brussels, (See « Bibliographical Decimal Classification as applied to Railway Science », by L. WEISSENBRUCH, in the number for November 1897, of the *Bulletin of the International Railway Congress*, p. 1509).

1959 **625 .14 (6)**
HILL (M.F.).
Permanent Way-Story of the Tanganyika Railways.
East African Railways and Harbours. (Price : 25 s.)

1959 **621 .132 .1 (09 (42)**
The Locomotives of the Great Western Railway.
Part 6 : *Four-coupled tank engines.*
B.F.J. TABOR and others.
The Railway Correspondence and Travel Society. Obtainable from The Hon. Publications Officer, 57, Heathfield Road, Kings Heath, Birmingham. 14. (Price : 10 s. 6 d.)

1959 **625 .28**
WRIGHT (Ph.).
Traction engines.
London : A. and C. Black Ltd., 4-6, Soho Square. (Price : 21 s.)

[**016** .385 (05]

II. — PERIODICALS.

In French.

Acier-Stahl-Steel. (Bruxelles.)

1959 **624 .92**
Acier-Stahl-Steel, décembre, p. 525.
CAIRONI (M.). — Sur la prédétermination des **caractéristiques élastiques des assemblages dans les constructions métalliques.** (3 000 mots & fig.)

Annales des Travaux Publics de Belgique. (Bruxelles.)

1959 **721 .9**
Annales des Travaux Publics de Belgique, n° 2, avril, p. 103.
VANDEPERRE (L.J.) & POMA (M.). — La **stabilité des fondations séparées pour pylones de grande hauteur.** Essais sur modèles réduits. (9 000 mots & fig.)

Bulletin de l'Association Suisse des Electriciens. (Zürich.)

1959 **621 .33**
Bulletin de l'Association Suisse des Electriciens, 21 novembre, p. 1176.
HÄNNI (F.). — Der **Fahrdiagraph.** (2 800 mots & fig.)

1959 **621 .31**
Bulletin de l'Association Suisse des Electriciens, 5 décembre, p. 1226.
DEUTSCH (F.). — **Berücksichtigung der Impedanz des Messbelages bei Verlustfaktormessungen.** (2 800 mots & fig.)

Bulletin scientifique de l'Association des Ingénieurs électriciens sortis de l'Institut Electrotechnique Montefiore. (Liège.)

1959 **621 .337**
Bull. scient. de l'Assoc. des Ing. électr. sortis de l'Institut Electrotechnique Montefiore, août, p. 489.
RINGLET (P.). — Les **amplificateurs magnétiques.** (5 000 mots & fig.)

1959 **621 .31**
Bull. scient. de l'Assoc. des Ing. électr. sortis de l'Institut Electrotechnique Montefiore, septembre, p. 535.
d'ADLER-RACZ (J.). — **Localisation des défauts sur lignes aériennes.** (2 800 mots & fig.)

1959 **621 .3**
Bull. scient. de l'Assoc. des Ing. électr. sortis de l'Institut Electrotechnique Montefiore, septembre, p. 545.
MAUGARD (M.). — **Mise en œuvre de la méthode du radar** et résultats d'exploitation. (3 000 mots & fig.)

Bulletin de la Société Française des Electriciens. (Paris.)

1959 **621 .33**
Bulletin de la Société Française des Electriciens, octobre, p. 621.
NOUVION (F.). — Où en est la **traction électrique** en France. Son évolution prochaine. Son rayonnement dans le monde. (9 500 mots & fig.)

1959 **621 .31**
Bulletin de la Société Française des Electriciens, novembre, p. 649.
ARRIGHI (R.). — Etude du comportement des écrans métalliques des câbles à isolation solide soumis à des courants de court-circuit. (7 500 mots & fig.)

1959 **621 .31**
Bulletin de la Société Française des Electriciens, novembre, p. 686.
GAUSSENS (P.). — La **production de l'énergie réactive** à l'aide des condensateurs sur les réseaux de distribution. (4 500 mots & fig.)

1959 **621 .35**
Bulletin de la Société Française des Electriciens, novembre, p. 698.
BLANCPAIN (A.). — **Batteries préfabriquées pour réseaux à basse tension.** (1 800 mots & fig.)

Bulletin des Transports Internationaux par Chemins de fer. (Berne.)

1959 **385 .62 & 385 .63**
Bull. des transp. intern. par ch. de fer, novembre, p. 276.
BORGOGNON (P.). — **Révision et refonte de la CIM et de la CIV.** (1 500 mots.)

Chemins de fer. (Paris.)

1959 **625** .28
Chemins de fer, septembre-octobre, p. 121.
CAIRE (D.). — **Faisons le point..!** (3 000 mots & fig.)

1959 **656** .222 .5 (494)
Chemins de fer, septembre-octobre, p. 126.
CAIRE (D.). — Quelques aspects de l'**évolution récente des méthodes d'exploitation des C.F.F.** (1 500 mots & fig.)

1959 **625** .285 (44)
Chemins de fer, septembre-octobre, p. 131.
PORCHER (B.). — Le **nouvel autorail panoramique** construit pour la S.N.C.F. par la Régie Nationale des Usines Renault. (5 000 mots & fig.)

1959 **385** (09 (52)
Chemins de fer, septembre-octobre, p. 144.
PORCHER (B.). — Les **Chemins de fer Japonais** poursuivent leurs efforts de modernisation. (2 500 mots & fig.)

1959 **621** .431 .72 (67)
Chemins de fer, septembre-octobre, p. 150.
LERAY (J.). — La **dieselisation** sur le Congo-Océan. (500 mots & fig.)

Revue Brown Boveri. (Baden.)

1959 **621** .31
Revue Brown Boveri, mai, p. 279.
Essais concernant la **tenue de l'isolation en présence de surtensions de manœuvres.** (4 300 mots & fig.)

1959 **621** .31
Revue Brown Boveri, mai, p. 299.
Simulation d'une machine synchrone par un calculateur analogique. (2 600 mots & fig.)

Revue Générale des Chemins de fer. (Paris.)

1959 **656** .254 (44) & **656** .257 (44)
Revue Générale des Chemins de fer, décembre, p. 721 et 723.
Une nouvelle orientation dans la **commande centralisée de la circulation.** Le poste de Mouchard et l'équipement de la ligne Dôle-Vallorbe.
I. **Introduction,** par M. WALTER. (500 mots.)
II. **Particularités de la signalisation nouvelle sur la ligne Dôle-Vallorbe,** par MM. VIGNIER & KEICHINGER. (8 000 mots & fig.)

1959 **621** .431 .72 (44)
Revue Générale des Chemins de fer, décembre, p. 743.
OLIVE. — Les **locotracteurs diesel-hydrauliques** de 32 tonnes, Série Y 7100 de la S.N.C.F. (2 500 mots & fig.)

1959 **621** .335 (44)
Revue Générale des Chemins de fer, décembre, p. 750.
AMET. — **La locomotive bi-fréquence BB 30.003** équipée de redresseurs au silicium. (900 mots & fig.)

1959 **625** .236 (44)
Revue Générale des Chemins de fer, décembre, p. 753.
GARIBALDI & JEAN. — Le **nettoyage du matériel à voyageurs.** La machine à laver de Marseille - Saint-Charles. (3 000 mots & fig.)

1959 **625** .42 (469)
Revue Générale des Chemins de fer, décembre, p. 775.
Le **Métropolitain** de Lisbonne. (1 200 mots & fig.)

Revue Générale de Mécanique-Electricité. (Paris.)

1959 **621** .9
Revue Générale de Mécanique-Electricité, octobre, p. 67.
LOISEAU (J.). — Nombreuses **améliorations dans les machines-outils** européennes. (14 000 mots & fig.)

Science et Vie. (Paris.)

1959 **621** .3 & **656** .254
Science et Vie, n° hors série, édition trimestrielle n° 49, p. 95.
HEMARDINQUER (P.). — **Sur route et sur rail, sur mer et dans l'air, sécurité accrue.** (4 000 mots & fig.)

1959 **621** .3
Science et Vie, n° hors série, édition trimestrielle n° 49, p. 108.
BOSSET (J.). — **Machines à traiter l'information.** (7 000 mots & fig.)

La Technique Moderne. (Paris.)

1959 **621** .3
La Technique Moderne, novembre, p. 553.
BACHELIER (J.). — **Electrama.** (*Suite et fin.*) (4 000 mots & fig.)

La Traction Electrique dans les Chemins de fer. (Bruxelles.)

1959 **621** .335
Bulletin du Congrès des Chemins de fer. — La Traction Electrique dans les Chemins de fer, n° 12, décembre, p. 605.
MUSYCK (E.). — Etude d'un dispositif destiné à améliorer l'utilisation de l'adhérence d'une **locomotive électrique** à courant continu. (*A suivre*) (4 500 mots & fig.)

1959 **621** .33
Bulletin du Congrès des Chemins de fer. — La Traction Electrique dans les Chemins de fer, n° 12, décembre, p. 616.
L'étude des **problèmes de traction électrique** à l'aide d'intégrateurs mécaniques ou de calculatrices électroniques. (4 600 mots & fig.)

1959 **621** .333 (42)
Bulletin du Congrès des Chemins de fer. — La Traction Electrique dans les Chemins de fer, n° 12, décembre, p. 631.
Application à la machine d'enveloppes aux silicones. (720 mots & fig.)

1959 **621** .431 .72 (73)
Bulletin du Congrès des Chemins de fer. — La Traction Electrique dans les Chemins de fer, n° 12, décembre, p. 637.
Mesure de l'usure des moteurs par la radio-activité. (1 500 mots & fig.)

Les Transports Publics. (Berne.)

1959 **625** .6 (494)
Les Transports Publics, décembre, p. 1.
La **situation des chemins de fer privés suisses** du trafic général. (1 600 mots & fig.)

La Vie du Rail. (Paris.)

1959 **691**
La Vie du Rail, 22 novembre, p. 6.
La matière plastique a fait son apparition dans le matériel ferroviaire. (500 mots & fig.)

1959 **385** (09 (494)
La Vie du Rail, 22 novembre, p. 17.
REICHEN (L.). — Les **Chemins de fer fribourgeois.** (3 000 mots & fig.)

1959 **656** .212 (44)
La Vie du Rail, 29 novembre, p. 14.
La **nouvelle gare marchandises** d'Orléans. (300 mots & fig.)

1959 **385** (09 .3 (435 .9)
La Vie du Rail, 6 décembre, p. 3.
Le Centenaire des Chemins de fer du Luxembourg. (1 000 mots & fig.)

1959 **656** .225 (44)
La Vie du Rail, 6 décembre, p. 8.
La Société de Traction et d'Exploitation de Matériel Automobile (STEMA) lance : **le poids lourd express.** (500 mots & fig.)

1959 **621** .33 (44)
La Vie du Rail, 6 décembre, p. 13.
Electrifications prochaines sur la Région du Nord : Creil-Aulnoye; Busigny-Somain; Lourches-Valenciennes. (3 000 mots & fig.)

In German.

Die Bundesbahn. (Darmstadt und Köln.)

1959 **656** .25 (43)
Die Bundesbahn, Nr. 20, Oktober, S. 934.
ROHDE (W.). — **Neuerungen die das Signalbuch 1959 bringt.** (4 000 Wörter & Abb.)

1959 **669** .71 (43)
Die Bundesbahn, Nr. 20, Oktober, S. 941.
TASCHINGER (O.). — Der **Werkstoff Aluminium** und seine Verwendung bei der Deutschen Bundesbahn. (9 000 Wörter & Abb.)

1959 **691** (43)
Die Bundesbahn, Nr. 20, Oktober, S. 958.
ESCHEMANN (H.). — **Kunststoffe** bei der Deutschen Bundesbahn. (4 500 Wörter & Abb.)

1959 **385** .4
Die Bundesbahn, Nr. 21, November, S. 1004.
OTTMANN (K.). — Die **innere Organisation der Eisenbahnverwaltungen.** (6 000 Wörter.)

1959 **656** .235 (44)
Die Bundesbahn, Nr. 21, November, S. 1015.
SCHUCHMANN (E.). — Der **französische Eisenbahngütertarif.** (8 000 Wörter & Tafeln.)

1959 **656** .225
Die Bundesbahn, Nr. 21, November, S. 1029.
KÖHNE (L.). — Die **transportable Prellbockrampe.** (2 000 Wörter & Abb.)

Deutsche Eisenbahntechnik. (Berlin.)

1959 **385** (09 (51)
Deutsche Eisenbahntechnik, November, S. 521.
LIU TSCHAN-HAN. — Zehn Jahre Aufbau der **Eisenbahnen im neuen China.** (2 500 Wörter & Abb.)

1959 **625** .232 (51)
Deutsche Eisenbahntechnik, November, S. 525.
KROPF (H.). — Der erste **Doppelstockwagenzug** der Volksrepublik China. (3 500 Wörter & Abb.)

1959 **656** .211 (43)
Deutsche Eisenbahntechnik, November, S. 532.
RICHTER (G.). — Der **Wiederaufbau des Leipziger Hauptbahnhofs.** Der Wiederaufbau der Querbahnsteighalle. (2 000 Wörter & Abb.)

1959 **624** .63 (47)
Deutsche Eisenbahntechnik, November, S. 537.
RINCK (K.-H.). — Die **neue Metro-Brücke** über die Moskwa bei Moskau, ein Bauwerk aus Spannbetonfertigteilen. (3 000 Wörter & Abb.)

1959 **625** .12
Deutsche Eisenbahntechnik, November, S. 542.
KEIL (K.). — Zwei bemerkenswerte **Beispiele für Stützmauerschäden** (Ursachen und Behebung). (3 000 Wörter & Abb.)

1959 **621** .332
Deutsche Eisenbahntechnik, November, S. 546.
KNAUST (H.). — Durchhangsberechnungen bei **Kettenwerkfahrleitungen.** (2 500 Wörter & Abb.)

1959 **621** .333
Deutsche Eisenbahntechnik, November, S. 552.
BUDIG (P.-K.). — Der moderne **Bahnmotor.** (*Fortsetzung.*) (1 500 Wörter & Abb.)

1959 **656** .223 .2
Deutsche Eisenbahntechnik, November, S. 555.
POTTHOFF. — **Leerwagenverteilung.** (3 000 Wörter, Tafeln & Abb.)

1959 **625** .251
Deutsche Eisenbahntechnik, November, S. 558.
HÖER (W.). — **Bremswege, Bremsprozente, Bremshundertstel.** (2 000 Wörter, Tafeln & Abb.)

1959 **625** .282
Deutsche Eisenbahntechnik, November, S. 562.
BÜTTNER (S.). — Die **Leistung der Diesellokomotive** in verschiedenen Höhenlagen bezw. bei verschiedenen Bezugszuständen. (1 500 Wörter & Abb.)

1959 **385** (09 (497 .1)
Deutsche Eisenbahntechnik, November, S. 565.
BIRKE (M.). — Stand und Ausrüstung der **Jugoslawischen Eisenbahn.** (1 500 Wörter & Karte.)

Der Eisenbahningenieur. (Frankfurt am Main.)

1959 **625** .171
Der Eisenbahningenieur, November, S. 327.
HAFERKORN (F.). — **Gleiszustandsmessung.** (3 000 Wörter & Abb.)

1959 **624** & **669** .1
Der Eisenbahningenieur, November, S. 335.
AHRENS (W.). — **Stähle für den Brücken- und Ingenieurhochbau.** (2 000 Wörter & Tafel.)

1959 **625** .17 (43)
Der Eisenbahningenieur, November, S. 338.
NISSEN (H.). — **Oberbauunterhaltung** bei den nichtbundeseigenen Eisenbahnen. (1 800 Wörter & Abb.)

1959 **624**
Der Eisenbahningenieur, November, S. 341.
JUNGNICKEL (H.). — **Entwässerungs-Rinnen und -Rohre für Brückenbauwerke** aus Kunststoff. (1 700 Wörter & Abb.)

1959 **621** .332
Der Eisenbahningenieur, November, S. 344.
HÜLSENKAMP (F.). — **Feuerverzinkte Stahlmaste.** (2 000 Wörter & Abb.)

1959 **621** .332
Der Eisenbahningenieur, November, S. 347.
HAUSMANN & DANGEL. — **Schienenverbinder für die Triebstromrückführung** auf elektrifizierten Strecken mit Gleisstromkreisen. (2 000 Wörter & Abb.)

1959 **621** .138 .5
Der Eisenbahningenieur, November, S. 350.
BRUNS (W.). — Aus der **Praxis des Werkstättendienstes.** (800 Wörter & Abb.)

E.T.R.-Eisenbahntechnische Rundschau. (Köln-Darmstadt.)

1959 **691**
Eisenbahntechnische Rundschau, Oktober, S. 432.
BIMBOES (K.). — **Kunststoffe im Hochbau.** (5 000 Wörter.)

1959 **625** .2
Eisenbahntechnische Rundschau, Oktober, S. 439.
TASCHINGER (O.). — Das **Problem der Leichtmetall-Schienenfahrzeuge.** (7 000 Wörter & Abb.)

1959 **625** .285 (495)
Eisenbahntechnische Rundschau, Oktober, S. 452.
MÜMMLER (K.). — **Neue Dieseltriebwagen** für die Peloponnes-Bahn. (2 000 Wörter & Abb.)

1959 **625** .1 (43)
Eisenbahntechnische Rundschau, November, S. 463.
HÄRTER (L.) & POHLENZ (L.). — Die **Altenbekener Verbindungskurve** und ihre Bedeutung für den Nord-Süd-Verkehr. (4 000 Wörter & Abb.)

1959 **621** .8
Eisenbahntechnische Rundschau, November, S. 473.
ZIEBART (E.). — **Strömungstechnische Grundlagen hydrodynamischer Getriebe und Kennlinien** sowie deren Beurteilung für den Antrieb von Schienenfahrzeugen. (7 000 Wörter & Abb.)

1959 **624** (43)
Eisenbahntechnische Rundschau, November, S. 487.
BAUMANN (F.). — **Eisenbahnbrücke bei Hösbach** über die Autobahn zwischen Aschaffenburg und Würzburg. (3 500 Wörter & Abb.)

1959 **624** .63 (43)
Eisenbahntechnische Rundschau, November, S. 493.
BÜHRER (R.). — **Vorgespannte Eisenbahnbrücken** aus Betonfertigteilen. (5 000 Wörter & Abb.)

1959 **656** .222 .1 (4)
Eisenbahntechnische Rundschau, November, S. 502.
Die **schnellsten Züge** Europas. (1 500 Wörter & Tafel.)

Elektrische Bahnen. (München.)

1959 **621** .335
Elektrische Bahnen, Heft 11, S. 242.
SEIBERT (K.-W.). — **Neue Ausführungen bei Steuerungen von Wechselstromtriebwagen.** (3 500 Wörter & Abb.)

1959 **625** .14
Elektrische Bahnen, Heft 11, S. 245.
NÖTHEN (J.). — **Die Tauch- und Nickschwingungen beim Überfahren einer Gleisunebenheit.** (Der Einfluss des ungefederten Gewichts auf die Laufruhe.) (*Fortsetzung.*) (8 000 Wörter & Abb.)

Elektrotechnik und Maschinenbau. (Wien.)

1959 **621** .31
Elektrotechnik und Maschinenbau, 15. November, S. 525.
HOCHRAINER (H.). — Betrachtungen zur **Dynamik von Servomechanismen.** (4 500 Wörter & Abb.)

Henschel - Nachrichten. (Kassel.)

1959 **625** .282
Henschel-Nachrichten, November, S. 32.
GÄHLERT (H.). — **Henschel-GM-Diesel-elektrische Lokomotive** Bauart TT 12-1425 PS. (3 000 Wörter & Abb.)

1959 **621** .431 .72
Henschel-Nachrichten, November, S. 39.
EWALD (K.). — **Explosions-Schutz an Diesel-Lokomotiven.** (1 000 Wörter & Abb.)

1959 **625** .282 (43)
Henschel-Nachrichten, November, S. 41.
ULLMANN (E.). — **Dieselhydraulische Henschel-Lokomotive** Typ DH 120. (1 000 Wörter & Abb.)

Internationales Archiv für Verkehrswesen. (Mainz.)

1959 **656** .2
Internat. Archiv für Verkehrswesen, Oktoberheft, S. 317.
FÜLLING (F.). — Der **Knotenpunktverkehr.** (7 000 Wörter, Tafeln & Abb.)

1959 **625** .6 (494)
Internat. Archiv für Verkehrswesen, Oktoberheft, S. 334.
KASPAR (C.). — Die **Annäherung der Tarife schweizerischer Privatbahnen an die Tarife der Schweizerischen Bundesbahnen.** (3 000 Wörter.)

Signal und Draht. (Frankfurt am Main.)

1959 **656** .257 (43)
Signal und Draht, November, S. 169.
KÜMMELL (K.F.). — **Neue Signaltechnik** im Raum Wiesbaden — ein Beitrag zur Lösung schwieriger betrieblicher Aufgaben. (12 000 Wörter & Abb.)

Verkehr. (Wien.)

1959 **656** (73)
Verkehr, Nr. 49, 5. Dezember, S. 1753.
WARTHA (J.). — **Wettbewerb zwischen Schiene und Strasse in USA.** (2 000 Wörter.)

Wissenschaftliche Zeitschrift der Hochschule für Verkehrswesen Dresden. (Dresden.)

1959-1960 **656** .2
Wissenschaftliche Zeitschrift der Hochschule für Verkehrswesen Dresden, Heft 1, S. 97.
POTTHOFF (G.). — **Steuerung und Zufall im Eisenbahnbetrieb.** (4 000 Wörter.)

1959-1960 **656** .212 .5
Wissenschaftliche Zeitschrift der Hochschule für Verkehrswesen Dresden, Heft 1, S. 103.
KURZ (H.). — Ein vereinfachtes Arbeitsmittel für die **Zeitermittlung bei Rangierbewegungen.** (2 000 Wörter & Abb.)

1959-1960 **385** (09 (519)
Wissenschaftliche Zeitschrift der Hochschule für Verkehrswesen Dresden, Heft 1, S. 113.
GEISSLER (G.). — Die **Staatsbahn in der Koreanischen Volksdemokratischen Republik** (KVDR). (4 000 Wörter & Abb.)

1959-1960 **656** .21
Wissenschaftliche Zeitschrift der Hochschule für Verkehrswesen Dresden, Heft 1, S. 125.
GEISSLER (G.). — **Betriebswissenschaftliche Untersuchung eines Eisenbahnknotens.** (3 500 Wörter & Abb.)

1959-1960 **656** .25
Wissenschaftliche Zeitschrift der Hochschule für Verkehrswesen Dresden, Heft 1, S. 155.
FENNER (W.) & FISCHER (K.). — **Gedanken über Selbstblock- und Führerstandsignalisation** im Zusammenhang mit dem neuen Signalsystem. (6 000 Wörter & Abb.)

1959-1960 **656** .211 .5
Wissenschaftliche Zeitschrift der Hochschule für Verkehrswesen Dresden, Heft 1, S. 185.
PIETSCH (H.). — Neuartige Ausbildung von **Bahnsteigdächern.** (3 000 Wörter & Abb.)

1959-1960 **385** .57 (43)
Wissenschaftliche Zeitschrift der Hochschule für Verkehrswesen Dresden, Heft 1, S. 235.
UHLMANN (J.). — **Probleme der Brigadearbeit und der Brigadierentlohnung** in den technischen Dienststellen und Ausbesserungswerken der Deutschen Reichsbahn. (7 000 Wörter.)

In English.

British Transport Review. (London.)

1959 **625** .14
British Transport Review, Vol. V, No. 4, August, p. 291.
HOYLE (H.). — **Making the most of the track.** (22 pages, illustrated.)

1959 **656** .222 .5
British Transport Review, Vol. V, No. 4, August, p. 334.
FIENNES (G.F.). — **The Madrid Congress passenger prospects.** (8 pages.)

The Chartered Mechanical Engineer. (London.)

1959 **621** .431 .72
The Chartered Mechanical Engineer, December, p. 456.
CARTER (D.). — **The presidential address : The Engineer, life and diesel engines.** (15 pages, illustrated.)

Electric Traction on the Railways. (Brussels.)

1959 **621** .333

Bulletin of the International Railway Congress Association. — Electric Traction on the Railways, No. 12, December, p. 561.

NERUEZ (J.) and BONNE (P.). — Problems in lubrication of **traction motor** bearings and gears. (3 500 words & fig.)

1959 **621** .336

Bulletin of the International Railway Congress Association. — Electric Traction on the Railways, No. 12, December, p. 582.

SÜBERKRÜB (M.). — Elasticity and dynamics of **overhead contact lines and current collectors,** their performance in the light of a new theory of vibratory movements, and the aero-dynamic influences on the pantograph during high-speed working. (*Concluded.*) (7 200 words & fig.)

1959 **621** .335 (43)

Bulletin of the International Railway Congress Association. — Electric Traction on the Railways, No. 12, December, p. 601.

MARTEN (F.). — A study of the electrical equipment of a **two-frequency locomotive with silicium rectifier,** built for the German Federal Railways. (2 300 words & fig.)

The Engineer. (London.)

1959 **621** .33 (42)

The Engineer, October 23, p. 482.

Third-rail traction at 1 200 V. (600 words & figs.)

1959 **621** .431 .72 (42)

The Engineer, November 20, p. 644.

Diesel hydraulic locomotive " D. 800 ". (3 800 words & figs.)

1959 **621** .13 (09

The Engineer, November 27, p. 699.

POULTNEY (E.C.). — **Some locomotives of 1909.** (4 600 words & figs.)

1959 **621** .431 .72 (498)

The Engineer, November 27, p. 714.

Swiss-built locomotives for Roumania. (700 words & figs.)

Gas and Oil Power. (London.)

1959 **621** .431 .72

Gas and Oil Power, November, p. 298.

SANSONI (R.). — **Diesel railcars on the O.M.** (*To be continued.*) (1 200 words & figs.)

Journal of the Institution of Electrical Engineers. (London.)

1959 **621** .335 (44)

Journal of the Institution of Electrical Engineers, November, p. 625.

NOUVION (F.). — **Performances of electric locomotives of the French National Railways.** (1 600 words & figs.)

Journal, The Institution of Locomotive Engineers. (London.)

1959 **385** (071 .3

Journal, The Institution of Locomotive Engineers, Vol. 49 (Part No. 2), p. 182.

TYLER (K.) and ALLEN (W.). — **Training in diesel traction at the British Railways,** Staff Training College, Derby. (32 pages, illustrated.)

1959 **621** .336

Journal, The Institution of Locomotive Engineers, Vol. 49 (Part No. 2), p. 236.

HILL (T.H.). — **Overhead contact systems for railway electrification.** (32 pages, illustrated.)

The Journal of the Institute of Transport. (London.)

1959 **656** .2 (489)

The Journal of the Institute of Transport, November, p. 204.

PEDERSEN (F.P.). — **Transport in Denmark.** (3 000 words & figs.)

The Locomotive. (London.)

1959 **625** .4 (42)

The Locomotive, November, p. 208.

Upminster depot London Transport. (2 000 words & figs.)

Modern Railroads. (Chicago.)

1959 **625** .143 .1 (73)

Modern Railroads, September, p. 117.

Why Western Roads like 3 new rails. (1 400 words & figs.)

1959 **625** .214 (73)

Modern Railroads, September, p. 151.

BARBER (W.G.). — **Ultrasonic testing cuts journal failures.** (2 000 words & figs.)

1959 **621** .431 .72 (73) & **621** .338 (73)

Modern Railroads, October, p. 49.

MEYERS (E.T.). — **Pennsy adopts " integrated insulation ".** (3 000 words & figs.)

1959 **625** .2 (73)
Modern Railroads, October, p. 63.
New approach to " unitized transport ". (800 words.)

Modern Transport. (London.)

1959 **625** .213 (42)
Modern Transport, October 10, p. 6.
Air-suspended railbus. (300 words & figs.)

1959 **621** .431 .72 (42)
Modern Transport October 17, p. 5.
Vickers-built Sulzer Diesel engines. (2 000 words & figs.)

1959 **385** (071 .3 (42)
Modern Transport, November 7, p. 3.
JOHNSON (H.C.). — **Training for the railway service.** (1 800 words.)

1959 **656**
Modern Transport, November 14, p. 20
Fares structures by air, rail and road. (3 000 words.)

1959 **621** .431 .72 (42)
Modern Transport, November 21, p. 5.
POULTNEY (E.C.). — **B.R. locomotive tests.** (1 200 words & figs.)

The Oil Engine. (London.)

1959 **621** .431 .72 (42)
The Oil Engine, July-August-September, p. 86.
Latest type-2 locos for Eastern Region. (800 words & figs.)

1959 **625** .172 (42)
The Oil Engine, July-August-September, p. 89.
Track-recording coach for British Railways. (900 words & figs.)

1959 **625** .213 (42)
The Oil Engine, October, p. 123.
Novel suspension on B.R. railbus. (800 words & figs.)

1959 **621** .431 .72 (47)
The Oil Engine, November, p. 164.
Russian locomotive development. (600 words & figs.)

Railway Engineering. (Cape Town.)

1959 **621** .132 .1 (68)
Railway Engineering, November, p. 30.
McARD (G.W.). — **The class 25 " Niagara " locomotives, the South African Railways.** (1 400 words & figs.)

1959 **625** .242 (43)
Railway Engineering, November, p. 34.
DAY (J.R.). — **German " portal " wagon is one of many designs for special goods traffic.** (900 words & figs.)

The Railway Gazette. (London.)

1959 **625** .172 (42)
The Railway Gazette, October 16, p. 298.
HARTLEY (G.S.). — **Progress in railway weed control.** (2 000 words & figs.)

1959 **621** .338 (42)
The Railway Gazette, October 23, p. 332.
Motor luggage vans for Southern Region. (400 words & figs.)

1959 **621** .338 (42)
The Railway Gazette, October 23, p. 333.
Electric trains for the Manchester-Bury line. (1 200 words & figs.)

1959 **621** .33 (52)
The Railway Gazette, October 23, p. 336.
Electrification on two systems in Japan. (1 500 words & figs.)

1959 **625** .213
The Railway Gazette, October 30, p. 362.
KOFFMAN (J.L.). — **Hydraulic dampers.** (3 000 words & figs.)

1959 **621** .133 .7 (42)
The Railway Gazette, November 6, p. 394.
Locomotive feed water treatment on British Railways. (900 words & figs.)

1959 **625** .28
The Railway Gazette, November 13, p. 422.
KOFFMAN (J.L.). — **Friction damping.** (2 400 words & figs.)

Diesel Railway Traction. (London.)

1959 **621** .431 .72 (94)
Diesel Railway Traction, October, p. 369.
Australian suburban railcars. (1 200 words & figs.)

1959 **621** .431 .72 (81)
Diesel Railway Traction, October, p. 375.
Diesel traction development in Brazil. (5 000 words & figs.)

1959 **621** .431 .72
Diesel Railway Traction, October, p. 381.
Performance of 3 000 HP locomotive. (1 800 words & figs.)

1959 **621** .431 .72
Diesel Railway Traction, October, p. 389.
A range of standard locomotives. (1 200 words & figs.)

1959 **621** .431 .72
Diesel Railway Traction, October, p. 395.
CAROLI. — **Cooling groups with thermostatic control.** (6 000 words & figs.)

1959 **621** .431 .72 (498)
Diesel Railway Traction, November, p. 403.
Large locomotives for Roumania. (7 500 words & figs.)

1959 **621** .431 .72
Diesel Railway Traction, November, p. 423.
S.R.M. hydraulic transmission. (4 500 words & figs.)

1959 **621** .431 .72 (494)
Diesel Railway Traction, December, p. 443.
Swiss shunting locomotives. (2 800 words & figs.)

1959 **621** .431 .72 (495)
Diesel Railway Traction, December, p. 450.
MUMMLER (K.). — **Triple-car trains for Greece.** (2 000 words & figs.)

1959 **621** .337
Diesel Railway Traction, December, p. 459.
Elements of electric transmission. (1 900 words & figs.)

Railway Track and Structures. (Chicago.)

1959 **625** .142 .4 (73)
Railway Track and Structures, November, p. 38.
What about the concrete crosstie ? (800 words & figs.)

In Spanish.

Ferrocarriles y Tranvias. (Madrid.)

1959 **614** .8
Ferrocarriles y Tranvias, vol. 25-IX, nº 289, p. 310.
LAMUELA BERRAONDO (E.). — **Comparación de accidentes en los medios de transporte aéreos y terrestres.** (1 200 palabras.)

1959 **656** .212 .5
Ferrocarriles y Tranvias, vol. 25-IX, nº 289, p. 312.
LANGSTON DAY (G.W.). — El **radar en los maniobras de vagones.** (1 500 palabras & fig.)

1959 **621** .133 .7
Ferrocarriles y Tranvias, vol. 25-IX, nº 289, p. 315.
CANDELA MUNAR (L.). — **Desincrustación de calderas.** (1 500 palabras.)

In Italian.

Giornale del Genio Civile. (Roma.)

1959 **624** .6
Giornale del Genio Civile, settembre, p. 739.
RAITHEL (A.). — Il **grado di sicurezza dei ponti ad arco.** (3 000 parole & fig.)

1959 **721** .4
Giornale del Genio Civile, ottobre, p. 864.
RENZULLI (T.). — **Prova a rottura di un arco incastrato in conglomerata armato.** (2 500 parole & fig.)

Rivista di Ingegneria. (Milano.)

1959 **621**
Rivista di Ingegneria, novembre, p. 1335.
FIORINI (V.). — Il metodo degli inviluppi nello **studio delle registrazioni di moti vibratori.** (3 000 parole & fig.)

Trasporti Pubblici. (Roma.)

1959 **656** .25 : **625** .42
Trasporti Pubblici, settembre, p. 1229.
CIRENEI (M.B.). — Oltre cinquanta anni di **segnalamento automatico sulle Metropolitane.** (6 000 parole & fig.)

1959 **621** .33 (45)
Trasporti Pubblici, settembre, p. 1265.
DARD (M.). — **Completamente elettrificate le linee da Bergamo a Milano.** (1 000 parole & fig.)

1959 **625** .2 (494)
Trasporti Pubblici, settembre, p. 1271.
L'ammodernamento del parco rotabile delle Ferrovie Retiche. (1 500 parole & fig.)

1959 **621** .333 (42)
Trasporti Pubblici, settembre, p. 1282.
Esperienze effettuate dal « London Transport Executive » sui **motori di trazione isolati con siliconi.** (1 200 parole & fig.)

In Netherlands.

De Ingenieur. (Den Haag.)

1959 **691**
De Ingenieur, nr 47, 20 november, p. Bt. 131.
BUISMAN (J.J.I.). — De **invloed van de doorsnededraaiing van op wringing belaste balken** op de momentenverdeling in daarop aansluitende platen. (3 000 woorden & fig.)

1959 **691**
De Ingenieur, nr 49, 4 december, p. Ch. 105.
RIENTSMA (L.M.). — **Corrosieonderzoek** en wat daaraan vast zit. (3 500 woorden & fig.)

Spoor- en Tramwegen. (Den Haag.)

1959 **656** .211 .7
Spoor- en Tramwegen, nr 23, 5 november, p. 369.
VAN HEE (A.H.). — **Treinveerboten** (Bacs-porte-train, Trainferries). (2 000 woorden & fig.)

1959 **625** .42 (47)
Spoor- en Tramwegen, nr 23, 5 november, p. 375.
De **Metro in Moskou.** (1 000 woorden & fig.)

1959 **385** (09 .3 (492)
Spoor- en Tramwegen, nr 24, 19 november, p. 385; nr 25, 3 december, p. 406.
LANDSKROON (E.P.A.). — **Beknopte geschiedenis der spoorwegen** in Nederland. (VIII en IX.) (8 000 woorden & fig.)

1959 **385** (09 (94)
Spoor- en Tramwegen, nr 24, 19 november, p. 389.
VAN BIJNEN (J.). — De **spoorwegen van Australië.** De Western-Australian Government Railways. (1 400 woorden & fig.)

1959 **656** .212 .6
Spoor- en Tramwegen, nr 24, 19 november, p. 391.
ENTER (H.F.). — De 8e **Salon de la Manutention** te Parijs. (1 600 woorden & fig.)

1959 **656** .2 (73)
Spoor- en Tramwegen, nr 24, 19 november, p. 393.
Amerikaanse spoorwegplannen voor 1960. (1 000 woorden.)

M. Weissenbruch & Co., Ltd., Printer to the King, 49, rue du Poinçon, Bruxelles.

M. WEISSENBRUCH & Co. Ltd.
Printer to the King
(Manag. Dir.: P. de Weissenbruch,
238, chaussée de Vleurgat, XL)

PRINTED IN BELGIUM

Edit. responsible: P. Ghilain